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TORSION OF THE UTERUS IN THE COW.

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Now that the parturition season is approaching, this not-too-pleasant state of matters may ere long fall for treatment to the lot of some reader. The following four cases—two bad and two good—may not be out of place.

Torsion of the uterus, with its twisting or screwing of the vagina near the os uteri, appears to be of comparatively rare and irregular occurrence. Some practitioners of long standing and extensive practice have not met with it—within two-and-a-half miles of my own door, I have had to face these cases during the last dozen years.

Case 1 (March 16th—20th, 1873).—A three-year-old quey; cross, Ayrshire—not unlike a Guernsey; of average height, slender, in good condition. Monday.—Been trying to calve for a few hours; pains rather severe, straining considerably; examination shows the quey not prepared for calving; little relaxation or softening of the parts, but in the vagina, close to the os uteri, two spiral coils and three or four folds or ridges, through which, with care and time and gentle dealing, the hand can be made to pass, and beyond which the os uteri can be felt constricted and closed. Sómehow I did not think that this was a real and true case of torsion. The coils and folds, though distinctly spiral or "cork-screw" in direction, appeared shallow. I had hope that as the parts relaxed and true labour-pains came on, these coils would wholly or partly disappear. Gave the cow a moderate dose of linseed oil and an ounce or so of laudanum; raised her a little behind; she quieted down. Tuesday.—Better; not straining; parts softer; more room; posterior twist or coil seems obliterated; os uteri has a better feel. Wednesday.—Still improving; a little

manipulation *all but* dissipates the inner, or rather anterior or front coil; the mouth of the womb dilated about two inches, and through it the finger feels a nose and the tips of two feet, with the membranes intact. Thinking only a little more time and care was needed, I did not see the quey till evening; found my instructions disregarded—she had got loose; been roaming all over the byre; straining and heaving all day, and was now unable to rise. In no enviable mood, I examined the poor beast, and found I could scarcely get my hand to enter; parts hot and dry, and very little room. Instead of going straight, the hand was forced to the off side, and far in, through some sort of a hole, projected, almost at right angles, a small foot and a few inches of a leg, and for long I could make out nothing farther. The result of three hours' work, in almost every position, was that this fore-leg stood out from the vulva to the pastern, while, two inches in the passage, was the swollen nose of a big, swollen head; and further progress in or out I could not. In mercy to the animal, we waited till next morning; removed the bones of the head, got up the other fore-leg; but decomposition was far advanced, and, despite every care and means, the calf parted far back in the loins. We got the fore, but the hindquarters we did not try to recover. The quey was sinking fast, all hope of a good result gone. She was slaughtered, and as the big, swollen, emphysematous hind parts of the fœtus—a foot and more across the back—were compared with the narrow pelvic outlet of the mother, one could scarcely feel surprise at the result. I leave, however, those who have felt to realise the pleasant feelings and sensations and nice self-examining questions to which such a case and such an ending give rise.

Case II. (March 5th and 6th, 1878).—Also a quey, three years old. Cross, nearly Shorthorn; big, strong, roomy, fat. Seven at night; the quey been trying to calve during the day. Twist in the vagina plain and unmistakable. The hand goes in for a foot or so, and is stopped. The passage seems short and ended, or strangely drawn together. Gently forcing your way in, your hand is guided to the off or right side, your fingers go slightly outwards and turn downwards, and forwards, and inwards through a soft, yielding opening, and as the hand passes through, it receives, lastly, a gentle outward and upward tendency; and as you straighten your arm to its original position, you find that you have gone through a corkscrew twist that now grasps and encircles your wrist, while underneath and in front of your hand is the calf and its membranes. Such was the feeling, so far as I can describe it, I experienced in my examination. Torsion to the right, one corkscrew turn.

In attempting delivery, I thought if I could secure the calf and

get part of it through the twist, the torsion of the uterus might be overcome. I ruptured the membranes, the quey being fully prepared, passed cords and secured fore-feet and lower jaw, and for hours tried my best to get the calf away, but failed. Hind-quarters raised a couple of feet; down first on one side, then on the other, then on her back, etc., etc., but did not roll her over and over. I could get one leg to the knee, and even the other to the pastern, or the head by itself, through the twist; but to get the head and legs to come together, or the one after the other, I could not.

An attempted study of Dr. Fleming's "Obstetrics" in the small hours of the morning was not a success. Something I saw and knew of "rotation" and "turning the cow," but it appeared a "Continental notion," "not much in it." Resolved to try again next day, and the result was failure. Two veterinary friends saw the quey in the afternoon—good cow-calvers both, not easily daunted—but they simply shook their heads. Out of this quey they see no way to get that calf. The animal is slaughtered, the udder skinned, removed, the symphysis pubis chipped through, the legs spread apart—the twist is plainly seen. I cut round the vulva, detached the vagina from its bony attachments, passed my hand into the vulva. One complete turn of the passage round my wrist dissipated the twist; another, the reverse way, reformed it. I could make or undo the twist at pleasure. The passage now is open to the calf, and one thinks that even yet the cow might be calved, only, unfortunately, she is past that, and the calf does smell.

Some one, like myself, may go home from such a case and settle to a quiet study of the "Obstetrics," and read that the "existence of torsion of the uterus may be said to be of recent discovery" (page 283); that many Continental, and one or two British, veterinarians have met with and described it (284-6); may see on page 299, Fig. 73, A, B, C, the positions of his hand, and on page 300, a very fair—though on a smaller scale, in an opposite direction, and not so good as the real—representation of his *post-mortem* examination. He may read of "Abdominal and Vaginal Taxis," "Hysterotomy," "Denoc'" and "Darreau's Procedure," and, lastly, and best, of "Rotation of the Cow's Body"; of how "German, French, Belgian, and Italian veterinary obstetrists have practised this method in a large number of instances, with most gratifying results"; and how "Mr. Cartwright, in England, has been successful in two cases." And reading and understanding, he may, like myself also, screw his face in vexation, and vow, if he again comes across a case of torsion, that he will lie down behind the cow, fix his hand in the twist, and roll her in a straw-shed for half-a-mile or half-an-hour.

Case III. (July 26th, 1883).—Ten o'clock on a summer night.

A rather large, good-looking foreign cow, four or five years old, in very good condition; been pained and heaving the greater part of the day. Half a turn in the vagina, also to the right, which every pain and heave converts into a very firm, almost impenetrable corkscrew twist, effectually blocking access or egress, especially if the cow is down. Ten at night, and only the owner at hand. Deferred the rolling process till the morning. Gave ¾ lb. of Epsom salts, ginger, etc., and four or five croton beans. Next morning, 9 a.m., cow much about the same, but the good effects of the physic very marked; bowels operating nicely; stomach decreased in size, contents fluid; the muscles generally, and especially of the haunches, soft and flaccid; twist still present, but participating in the general relaxation. I had hopes of delivery without rolling. Secured the off fore-pastern of the calf and lower jaw with cords, and was making, apparently, not unsatisfactory progress through the twist, when the cow gave a struggle, got down, and sprang up again. I held on to the calf, when suddenly something gave way. There was, as it were, a lurch or dip of the calf within the cow, and, to my surprise, the calf, which had been coming with the top of its head to the cow's sacrum, now lay on its back, with its withers to the udder and its feet to the vertebræ. *But the twist was gone.* An awkward position, but a free passage now in the cow. We had still command of the off fore-leg and head. Slowly these were pulled to the near side of the mother, my hand assisting inside, and gradually the calf upturned to its proper position. We recovered the near fore-leg, calved the cow—a dead calf, but a living mother, that did well.

Case IV. (January 3rd, 1886).—On Sunday night, the first of the present month, about eight o'clock, a young farmer rode down, asking me to see a cow which had been trying hard to calve from the Saturday afternoon. I gave the young fellow a word of remonstrance and advice, but went to his place. A big, well-made, aged cow—Irish, probably—with an udder about the size of a small sheep; paddling about and heaving; very dull and stupid; not unlike a "Milk-Fever" case, but with torsion to the right of the uterus only too well and plainly felt. The hand goes in—is directed to the off or right side—the floor of the passage becomes flat and broad; at the seeming end there is, as it were, a thick cord stretched across, over which the fingers fall, and, taking a sort of corkscrew turn, find the membranes and fœtus on the off side. Ten on a winter's night; only two men—fall back on ¾ lb. Epsom salts, ginger, and sulphur, two or three glasses of spirits, and about 8 oz. linseed oil. 9 a.m. next morning: cow seemingly worse—been very ill about two, and at five; trying hard to calve. Twist more confirmed—all efforts to get through as the cow lies are vain. Good effects from the

physic. Stomach decreased in size; contents fluid; animal in a much better state for rolling than the previous night. I explained to the owner the state of matters, telling him that I would try what I called the "French" system of "rolling," and if that failed, that he should kill the cow; as to attempt to calve her with the twist would be foolish and cruel. I looked round for a place on which to roll the cow. We were fortunate. The byre was a long and new one, half empty—a nice level seven-feet concrete floor behind the cows, and some nice short barley-chaff for bedding at hand. We cleared the space, covered it with a few inches of chaff, and our rolling platform was ready. Pushing, or rather dragging, the cow to it, she sprang to her feet and stood; but examination showed no change in the twist.

Taking up a soft plough-rein, I divided it; this gave two nice ropes, each four yards long. Laying these side by side, I knotted them together by two simple knots one and a-half yards from each end. This gave a short double portion, eighteen inches or so, in the centre, which I laid on the cow's back, and four ends or tails, each one and a-half yard long, for the legs. Telling a man to pick up the near fore-leg, I secured it with one of the ends by a double hitch at the pastern; the off fore-leg was then gently drawn from under her, and secured with another end of the rope, the cow falling on the chaff, on her knees. She then lay down naturally, on the off side; the hind-feet were searched for, the hocks flexed, and the pasterns secured by the two remaining ropes. The cow now lay with her knees and hocks flexed, each leg bound to its respective side and to the back. She was as like a barrel as we could make her; the "rolling" of her was a very simple process.

The torsion was to the right or off side. I decided to roll the cow from the right to the left, *i.e.*, from the off to the near side. Placing a man at the cow's head, two at the withers, and two good ones at the haunch and tail, over went the cow from the off side, across her belly, to the near; over then from the near, across her back, to the off again. She had had one complete turn. I examined her anxiously for the result, and found the twist far worse than before. Another turn on the screw—no passage through now, and entrance only for a very short way into the twist. Plainly, the wrong way to turn.

Kneeling down now, I fixed my hand as far in the twist as I could, told the men to come round and reverse the process; released the near hind-leg from its rope, gave it and the udder in charge to one of the men. Over from the off side, across her back, to the near went the cow.—Feeling inside better. Over from the near, across her belly, to the off. Twist much as at first—rather better. Over from the off, across her back, to the near—decidedly

better. Over from the near, across her belly, to the off—twist going. Over from the off, across her back, to the near side. We had got to the end of the byre, we could get no further; but we had got far enough—*the twist had gone.* The cow which, a few yards up that byre, had within her the worst torsion and twist of all the four cases, now lay before us a plain, simple case, plenty of room, os uteri dilated two or three inches, membranes unbroken. We returned a very hearty vote of thanks to Dr. Fleming and his Continental friends on the spot, and in Scotch New Year fashion did not forget them.

We left the cow with her feet tied, lying naturally where she was; but we noted the change on her. From a dull, spiritless beast she brightened up, took some water, and, in a short time, a little hay. True labour-pains shortly came on. An hour afterwards, the os was dilating nicely: a heave ruptured the membranes, the waters escaped, liquor amnii, sediment, etc.—a regular flood, as old cows have. Another hour, the second bag (allantois) almost intact; the cow rolled over; we released her feet, and she walked staggeringly to her stall. Another hour gave us the relaxation of the parts we wished; with gentle traction, a full-sized bull-calf, apparently dead, but which soon gave signs of life; and mother and calf need only a little attention and care—they do well.

Remarks.— Case I. shows the good and the bad effects of waiting. In some instances, it cannot be doubted, there are spurious coils and ridges, which sometimes disappear as parturition advances; but my sympathy is with the man (and his patient) who, with parts hot and dry and narrow, and calf strong-smelling and swollen, has even the semblance of a twist with which to contend.

Case II. shows how vain and futile were the attempts, even in a "roomy" cow, to extract the fœtus through the twist. This case resembles very much Case IV., and the same treatment would, I believe, have given as good a result.

Case III. shows the good effect of a moderate dose of physic. How can the uterus or its contents turn, if the rumen is filled with solid food? Also, that a partial twist may sometimes, by taxis or otherwise, be dissipated without rolling.

Case IV. shows the superiority of the "rotation of the cow's body."

Cases I. and II. were hard work, pain, and death. Case III. was work and some success. Case IV. was little work, some manœuvring, a rather weary waiting, but a pleasant finish.

To those who have long known and practised the "rolling" system, these cases offer nothing new; such may smile at the errors of the first two cases, and, perhaps, be pleased with the success of the two last. But to young practitioners, and even to

elderly veterinary surgeons who may not have had, but who soon may have, experience of such cases, I would simply say, so far as my experience goes: When called to a case in which torsion is really present, do not waste time and exhaust yourself and your patient by strong, and almost certainly vain, attempts to deliver through the twist, and then take to rolling as a last resource. Leave membranes as they are—give laxative if needed. *Make up your mind to turn first.* Nothing is simpler, nothing easier. A concrete floor and chaff in my case did well; failing that, a straw shed, a barn floor, a gravel walk, a grass field, or even a turnpike road, should do—any place firm and level. Cast and tie in the way described, or in some better way. Do not cast with hobbles. Flex hocks and knees, and keep each leg to its own side—do not cross. Give all freedom to the abdomen; keep the ropes on the ribs, not in the flank. Fix your hand in the twist, and assist in dissipating it. Do not puzzle as to how to roll —*roll as best for your case.* Turn well; not the fore-quarters first and the hind after them,—roll all at once; keep the head down; give a regular brewer's-barrel roll—slowly, deliberately, effectually. I do not say success will follow; I only give the result of my last case.

The slight experience I have had corroborates what is stated by Dr. Fleming (on page 312, at foot) as to Saint Cyr's conclusions. All my cases were torsion to the right. Case IV. I rolled from right to left, and made the twist worse. "In torsion to the right, roll from left to right," or from near to off side. Why?

Given a bag with a cheese in one end and a ham in the other, and a twist in the centre of the bag. That twist may be got rid of by keeping the cheese stationary and turning the other end with the ham, or by fixing the ham and rotating the cheese. But in a case of torsion of the uterus it appears to me that we have no choice—the calf objects. At every attempt to force calf and uterus back to their true position by rolling contrary to the twist, the gravid uterus hangs back, and every turn of the cow adds to the screw. But reverse the process. Keep the twist stationary with the hand, roll the cow to the twist, and slowly the cow herself undoes its folds—the passage is cleared, the calf is at its mother's and the attendant's pleasure.

One practical remark—"Delay is sometimes dangerous;" at other times it is "better to make haste slowly." A quick delivery may mean death to mother or offspring, or, at least, tardy recovery. The weary waiting and cautious working and success of the human obstetrist are proverbial. Might not veterinary practitioners learn a little? After reducing a case of torsion, do not hurry; with returning strength may come returning labour-pains, relaxation, and life to cow and calf.

In closing, I would most heartily and sincerely express my thanks to Dr. Fleming and his work—"Veterinary Obstetrics." To all interested, I would advise a careful and earnest perusal in the full investigation of the subject. From that work, and from it alone, I learned the principle of rotation, though, unfortunately, I forgot the details; and, though as a drop in the bucket, it may gratify Dr. Fleming to know that his work has saved one man's cow and her calf—saved the mother much pain, and one veterinary practitioner much worry and vexation, converting what was a weary, dismal piece of work into a pleasure and a source of gratification.

CARBONIC ACID IN THE AIR OF STABLES.

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In the paper I read before the Central Veterinary Medical Society on "Air and its Relations to Health and Disease," I dwelt on the importance of the determination of carbonic acid in stable air as an indication of the organic purity of the atmosphere. I did not in this communication mention any special difficulty I had encountered in determining this gas, as my experiments were not at that time complete. Since then I have been enabled to overcome this difficulty, and the subject of the present communication is to place before the profession a knowledge of it, which is quite new to science, how it may be overcome, and to record other observations on stable air of practical importance, especially with regard to ventilation.

To state the case briefly, my difficulty was this: after making many analyses of stable air, I could not make up my mind that the carbonic acid found represented *the whole* of the organic impurity which was present in the stable. The labours of Parkes and De Chaumont proved that a constant proportion existed between organic impurity of rooms and the carbonic acid of such rooms; analyses of stable air did not give identical results.

The question then resolved itself into two points; either my analyses were incorrect from defective manipulation, or else something was present in the air of stables which was absent from that of human habitations, and which partly destroyed this indication of organic purity of half its value.

By repeating my analyses scores of times, I entirely eliminated any error which might have arisen from defective manipulation, but still the results did not accord. I was therefore compelled to fall back upon my second supposition, viz., that there was something in the stable air which acted in such a manner as to make the carbonic acid appear less than it should be. By this time I felt convinced that this something was *ammonia*.

We know that when urea decomposes, it breaks up, among other substances, into ammonium carbonate, and that the gas from this salt is always present in stable air. I thought at first that the ammonia neutralised the CO_2, but what I afterwards found took place was this: the ammonia so acted on the baryta water (into which the air is introduced to determine the CO_2) as to increase its alkalinity (the effect of CO_2 being to decrease it). In other words, the ammonia was present to such a great extent as to reduce the affinity for barium which carbonic acid posesses, and thus the full amount of this gas was not obtainable on analysis.

These results were only obtainable after laborious analyses, and some of these I propose detailing.

Experiment I.—A stable capable of holding eight horses, with ample means for ventilation by doors, windows, and ridge in roof, was selected for the purpose of experiment. The windows were closed, one door only left open, and the stable contained its full number of occupants. Air was collected one foot from the ground, at the bottom, middle, and top of this stable; the following were the results:—

At the bottom of the stable the		CO_2	=	·7322	per 1,000 vols. of air.	
„	middle	„	„	= 1·1542	„	„
„	top	„	„	= ·7851	„	„

All doors and windows were now opened, and the air examined fifteen minutes later.

At the bottom of the stable the		CO_2	=	·5869	per 1,000 vols. of air.	
„	middle	„	„	= ·7091	„	„
„	top	„	„	= ·5691	„	„

In another stable examined in a similar manner, but of which the doors and windows had been opened all the morning, and no horse had occupied it for two hours, I found on the floor of the stall, opposite to the open windows, ·5888 vols. CO_2 per 1000. *Four feet above this I found* ·7931. This latter experiment gave me the cue to another method of investigation, as there was evidently a considerable difference between the layer of air close to the ground and that a few feet above it.

Experiment II.—The stable as described above was used for this experiment, the windows of which had been closed for twenty-four hours, and one door only open, and this but partly:

Air collected	1 ft.	from the ground	at bottom of stable	=	·6040	CO_2	per	1,000.
„	6 ft.	„	„ „	=	·9064	„	„	
„	1 ft.	„	middle	=	·6680	„	„	
„	6 ft.	„	„	=	·8463	„	„	
„	1 ft.	„	top	=	·4897	„	„	
„	6 ft.	„	„	=	1·2712	„	„	

The air at the top of the stable was taken close to, but behind, the only door which was open, yet the air shows great impurity.

All the windows and doors were now opened, and the air examined half-an-hour afterwards :—

Air 1 ft.	from the ground	at the bottom of the stable			= ·4533	CO_2 per 1,000.	
„ 6 ft.	„	„	„	„	= ·6322	„	„
„ 1 ft.	„	„	middle	„	= ·4688	„	„
„ 6 ft.	„	„	„	„	= ·4252	„	„
„ 1 ft.	„	„	top	„	= ·3822	„	„
„ 6 ft.	„	„	„	„	= ·4862	„	„

All the airs collected six feet above the ground were opposite to open windows, and about eight feet distant from them.

The external air during the above experiments = ·3966 CO_2 per 1,000.

In all the above experiments there is *only one exception* to the rule—that the air one foot from the ground is apparently more pure than that six feet above it.

To ensure accuracy the experiment was repeated.

Experiment III.—The external air on the ground = ·3429, and six feet above ·3118 CO_2 per 1,000 :—

Air 1 ft.	from the ground	at the bottom of the stable			= ·4271	CO_2 per 1,000.	
„ 6 ft.	„	„	„	„	= ·8771	„	„
„ 1 ft.	„	„	middle	„	= ·5234	„	„
„ 6 ft.	„	„	„	„	= ·9793	„	„
„ 1 ft.	„	„	top	„	= ·4687	„	„
„ 6 ft.	„	„	„	„	= 1·0197	„	„

All doors and windows opened; air examined again in thirty-five minutes :—

Air 1 ft.	from the ground	at bottom of stable			= ·3750	CO_2 per 1,000 vols.	
„ 6 ft.	„	„	„	„	= ·5096	„	„
„ 1 ft.	„	„	middle	„	= ·4232	„	„
„ 6 ft.	„	„	„	„	= ·5898	„	„
„ 1 ft.	„	„	top	„	= ·4039	„	„
„ 6 ft.	„	„	„	„	= ·5691	„	„

Experiment IV.—Experiment again repeated under identical conditions. The external air on the ground = ·3934, and six feet above it ·3875 CO_2 per 1,000 vols. :—

Air 1 ft.	from the ground	at bottom of stable			= ·6363	CO_2 per 1,000 vols.	
„ 6 ft.	„	„	„	„	= ·8706	„	„
„ 1 ft.	„	„	middle	„	= ·7647	„	„
„ 6 ft.	„	„	„	„	= ·6603	„	„
„ 1 ft.	„	„	top	„	= ·4957	„	„
„ 6 ft.	„	„	„	„	= ·9558	„	„

All windows and doors were now opened, and the air examined again in half-an-hour :—

Air 1 ft.	from the ground	at bottom of	stable	= ·5785	CO_2	per 1,000	vols.
„ 6 ft.	„	„	„	= ·6707	„	„	
„ 1 ft.	„	„	middle	„ = ·5980	„	„	
„ 6 ft.	„	„	„	„ = ·6012	„	„	
„ 1 ft.	„	„	top	„ = ·6328	„	„	
„ 6 ft.	„	„	„	„ = ·7827	„	„	

There is only one exception in the above experiment to the general rule.

Experiment V.—Another stable was now selected for experiment. It had a closed roof, and only one window was open; the bedding, strongly ammoniacal, was in the stall, and two horses had occupied the place for thirty-four hours, one being removed to admit of room for the experiment.

The CO_2 of external air = ·3672 per 1,000 vols. one foot above, and ·4904 seven feet above the ground. It was taken close to a wall, and near some trees, which may account for the larger amount above the ground.

The air taken eighteen inches above the stable floor, on which had been placed some ammoniacal litter = 1·2983, 1·0952, and 1·1080 CO_2 per 1,000 vols.

At a height of eight feet above this the air gave 1·4644, 1·3207, and 1·4122 CO_2 per 1,000 vols.

At a height of twelve feet four inches the air gave 1·3623, 1·7530, and 1·7937 CO_2 per 1,000 vols.

The increasing impurity as we leave the ground is very marked; but it must be remembered that there was no outlet in this roof, and the only window open had been closed.

Experiment VI.—The above experiment was repeated in another stable, ventilated by means of a ridge. The CO_2 of external air = ·3304 per 1,000 vols.

Air taken at a height of eighteen inches from the stable ground = ·5513, ·5665, ·5955 CO_2 per 1,000 vols.

At 7 ft. 4 in. above the ground it = ·7301, ·7082, ·6970 CO_2 per 1,000 vols.
„ 10 ft. 9 in. „ „ = ·6455, ·6450, ·6011 „ „

The important point to notice here is the increasing purity of the upper stratum of air.

Is this constant difference between the amounts of CO_2 on the ground and six feet above it due to the stable ammonia?

Experiment VII.—The following experiments were made:—Air on the ground gave 1·2983, 1·0952, 1·1080 CO_2 per 1,000 vols. After sprinkling the place with ammonia it gave ·8141, ·7358, ·9852 CO_2 per 1,000 vols. Unfortunately, this experiment was spoiled by the door being opened between the two collections.

Experiment VIII.—This experiment was carried out to prove the ammonia theory. Air was collected at a height of twelve inches

from the ground. It gave as follows :—·4885, ·4671, ·4134, ·4406, ·4146, ·4375 CO_2 per 1,000 vols.

The ground was now sprinkled with a solution of caustic ammonia. The vapour arising was at times much stronger than is found in most stables, but it rapidly became diluted, and was quite imperceptible unless renewed. The air was collected in exactly the same place, and at the same height as before, and the CO_2 was = ·0791, ·2438, ·1926, ·0174, ·2063, ·0368 per 1,000 vols.

Experiment IX.—The experiment was again repeated, carbonate of ammonia, instead of the caustic, being used.

The mean of three analyses of the air = ·3428 CO_2 per 1,000 vols. Some of the powdered salt was placed on the ground ; the smell of ammonia was now marked, and the mean of three analyses showed the CO_2 to = ·2632 per 1,000 vols.

The results of this analytical work may thus be summarised :—

1. In a stable where ridge ventilation, or an outlet in the roof exists, the upper stratum of air is the purest ; the stratum next the ground is very impure, though, owing to the presence of ammonia, this is not apparent. In collecting, therefore, stable air in future for analytical purposes, it should never be taken nearer than six feet from the ground. In stables where no outlet exists in the roof the upper stratum of air is the most impure.

2. The amount of carbonic acid in different parts of the same stable is not the same. Selecting those specimens, from the tables given, collected six feet above the ground, we find :—

		BOTTOM.		MIDDLE.		TOP.
Experiment II.	*a*	·9064	...	·8463	...	1·2712
	b	·6322	...	·4252	...	·4862
Experiment III.	*a*	·8771	...	·9793	...	1·0197
	b	·5069	...	·5898	...	·5691
Experiment IV.	*a*	·8706	...	·6603	...	·9558
	b	·6707	...	·6012	...	·7827

Opposite to the letter *a* are the amounts found before ventilation, and opposite *b* the amounts after all windows and doors were opened.

A glance at the table will show what I mean ; sometimes the middle and sometimes the bottom of the stable was the least impure, but the top of the stable, although close to the only door, which was open, was invariably the most impure. Here then, undoubtedly, we had some local condition affecting the results, and at this place were two drains, the only two which existed in the stable.

Opposite the line (*b*) it will be observed that sometimes one-half, sometimes two-thirds, of the carbonic acid has been removed by half-an-hour's free ventilation. Moreover, the amounts found

correspond very closely with those I have laid down as being the admissible limit of CO_2 in pure stable air, viz., ·6 per 1,000.* These results are very important, for from this data can be calculated *the amount of air supplied.* In the case of the occupants of this stable they were receiving 37,500 cubic feet per hour per head. This point I must defer until a future paper on ventilation.

3. Experiments VII., VIII., IX. proved clearly the influence of ammonia in the air on the determination of CO_2. These show that if ammonia is present in any appreciable amount, the results of the carbonic acid analysis by baryta water are unreliable if made close to the ground. It must be clearly understood that *the ammonia does not render the air more pure by removing a part of the* CO_2, but what it really does is to affect the sensitiveness of the baryta water in which the air is collected, and make it *appear* to be purer than it really is. This is a fact which has hitherto never been recognised. To avoid the fallacy arising from it the air must be collected at least six feet above the ground.

GLANDERS IN MAN: RECOVERY.

BY F. RAYMOND, F.R.C.V.S., ARMY VETERINARY DEPARTMENT, WOOLWICH.

DURING the hot weather of 1884, while making a periodical inspection of the horses of Battery F 2, Royal Artillery, at Nusseerabad, India, I discovered an outbreak of Glanders. I remained there two months, during which time eight horses were destroyed, suffering from all the symptoms of acute Glanders, and *post-mortem* examination in each case confirmed my diagnosis. When the outbreak was apparently stamped out I returned to my head-quarters, and soon after was moved to another district.

After my removal, a fresh case occurred. This animal, the last attacked, was inspected by a board of three veterinary officers, declared to be glandered, and destroyed.

I have lately met one of the medical officers who was in charge of the hospital at Nusseerabad—Surgeon O'Flanagan, M.S., who told me the following :—

During the prevalence of Glanders in the battery, in 1884, two cases came under my notice. The first, a private, reported himself as feeling ill and suffering from "lumps" in the neck. Upon examination I found that these were enlarged lymphatic glands. During the next few weeks, almost all the superficial glands of the body became enlarged. About a week after the admission of

* Showing that in this building ample means existed for ventilation if only allowed to act.

the first case, a gunner, who had been employed to groom sick horses, reported himself as suffering from similar symptoms, which ran a similar course. Later on a muco-purulent discharge occurred from the nostrils in both men, which were carefully examined. The mucous membrane was found intensely inflamed, and high up several ulcers were visible, but owing to their distance it was difficult to determine their exact character. The disease resembled neither Septicæmia, Tuberculosis, nor Syphilis, but in some respects was not unlike Lymphadenoma; but in the latter disease there is no ulceration of the membranes, nor discharge from the nostrils. A consultation of medical officers was held, and after most anxious consideration they reported the disease to the Surgeon-General, Bombay, as Glanders.

The men were in hospital eleven months in India, were then invalided home to the Herbert Hospital, Woolwich, from which they were discharged for duty about three months ago. The ulcers disappeared two months after admission at Nusseerabad, but the glands remained enlarged and very painful for a very long time.

The treatment adopted was as follows: The nostrils were syringed with solution of corrosive sublimate, 1-1,000. An inhaler was constantly worn (day and night), on the sponge of which 10 drops of equal parts of spirits of turpentine, creosote, tincture iodine, and oil of Eucalyptus were frequently dropped, the proportions of the mixture being constantly varied. Internally the men received 1 gr. of iodoform three times a day in a pill, for a fortnight at a time, varied with a fortnightly course of tonics, as syrup of iodide of iron. Most generous diet was given.

I regret my inability to give exact data, as I destroyed all papers relating to the outbreak, when I left India. Surgeon O'Flanagan has also been much moved about since then, but found the men at the Herbert Hospital when he came home.

Hitherto I have been thoroughly sceptical concerning recoveries from Glanders, but I think I have been able to prove, at any rate to my own satisfaction, that in this instance it really took place.

ON CERTAIN PATHOLOGICAL CONDITIONS MET WITH IN THE TESTICLES OF HORSES.

BY JAMES BRODIE GRESSWELL, M.R.C.V.S., LOUTH.

It is my purpose to describe, very shortly, some instances of diseased testicles in horses, as I believe that, although not of very uncommon occurrence, they may, nevertheless, prove of some interest to the readers of the Veterinary Journal.

On December 25th, the writer was summoned to make a *post-mortem* examination on a cart-horse, which had been attended by a local practitioner. On opening the abdomen, it was easily seen that the animal had died from an extensive rupture of the colon. In the inguinal region there was an immense tumour, about the size of a man's head. Being interested as to the exact pathological condition of this swollen testicle, I removed it, and examined the organ carefully. The skin covering it and all the tunics were firmly adherent to the gland, but after considerable trouble the testicle and the cord were dissected out. The whole mass weighed five pounds and six ounces; the testicle and cord alone weighed four pounds and three ounces. On cutting into the testicle, the true gland tissue was found to be replaced by firm fibrous tissue, interspersed with fat, and in the centre there was a cavity, of the size of a small orange, containing caseous matter, pus, and a number of well-developed strongyles, which I have no hesitation in pronouncing as specimens of strongylus armatus. Two of these are remarkably well developed, and the internal structure is seen to be of a bright-red hue.

Last summer I was called upon to castrate a colt, with its off-side testicle in a similar condition to the above. In this instance the gland weighed nineteen ounces and three drachms. The coverings of the testicle and the skin of the scrotum were likewise firmly adherent in this case. During the operation the hæmorrhage was considerable, and proceeded mainly from a large quantity of cellular tissue developed around the gland and the cord. The microscopical features of the two testicles revealed the same pathological fibrous and fatty degeneration. Although such *degeneration* is not uncommon in horses, I have never before met with a small colony of the armed strongyles in this situation.

NOTES ON THE BRITISH PHARMACOPŒIA, 1885.

BY "PHARMACON."

THE issue of a new pharmacopœia is a matter of great importance to prescribers of medicine, and we cannot too soon become acquainted with its various features, more especially in so far as they directly affect our daily therapeutics.

The new British Pharmacopœia came into force as soon as it was published, and we may reasonably expect that the wholesale chemists will now supply preparations according to it, unless specially ordered according to the 1867 edition.

On glancing over the preface, we first notice the discontinuance of the old chemical notation, and the adoption of the modern

system for representing the composition and constitution of chemical substances ; then, naturally following this, is the change of names of salts, as carbonates, nitrates, etc., which are now considered salts of the metals, potassium, sodium, etc., instead of salts of potash and soda, etc.

Next comes the change in names of the alkaloids, which have received the Latin termination of *ina;* thus, strychnia is now strychinina, and morphia, morphina. It may take some little time to become accustomed to these changes, but it is a step towards uniformity, and in accordance with Continental usage. Neutral principles are made to end in *inum*, as ergotinum.

In stating the relative quantities of ingredients, an attempt has been made to introduce a method of expressing the component ingredients in parts—both weights and proportional parts are given, thus :—

Acetic acid 1 pint, or 1 fluid part.
Distilled water 7 pints, or 7 fluid parts.

Wherever this method is employed, we are told "parts" signifies parts by weight, and "fluid parts" signifies the volume of an equal number of parts of water. The introduction of "parts" is evidently paving the way for substituting parts for weights in a future edition.

Temperature is still expressed in Fahrenheit's degrees, but the centigrade equivalent is also added in brackets, and in a future edition we may expect to see the adoption of the centigrade scale, which is mostly used by scientists, and would be a source of greater uniformity.

There is a long list of alterations in names, but most of them are a necessity of the alteration in the nomenclature.

The clearer definition given to the degree of disintegration to which vegetable powders are to be reduced before they are submitted to the various pharmaceutical processes, is an important and welcome change. We are now ordered to reduce the drugs to the degree of fineness No. 20, 40, or 60, these numbers indicating the number of meshes in the linear inch of the sieve used.

Standardising drugs is, for the first time, introduced into this work, and the recognition of this principle is one of the leading features, and is one of the most distinct advances of the new pharmacopœia, as it enables the therapeutist to use potent remedies with greater exactitude. The drugs are assayed in order to ascertain the amount of their active principles, which must be up to a certain standard, and all preparations from these drugs have their alkaloidal strength stated, which can be estimated by processes given in the Pharmacopœia. The drugs directed to be standardised are cinchona, opium, nux vomica, and their preparations.

We now come to the text proper, and it is proposed to note the changes only so far as we think they may affect and interest the veterinary practitioner.

Acids.—In the list of acids we have none expunged, only two altered, and ten additions. The two that have undergone change of importance are sulphurous and aromatic sulphuric (or elixir of vitriol).

Acidum Sulphurosum is now made to contain only 5 per cent. of sulphurous anhydride; this will be a more stable preparation than the old and stronger acid.

Acidum Sulphuricum Aromaticum.—The preparation is changed, and the product is a paler and less aromatic preparation, but therapeutically it remains as before.

Of the acids now made officinal, the following are the only ones at all likely to interest veterinary surgeons:—

Acidum Boricum, known for its antiseptic properties.

Acidum Carbolicum Liquefactum.—This is crystallised carbolic acid, with 10 per cent. of water added. It is a handy and convenient preparation, and remains fluid at ordinary temperatures.

Acidum Chromicum (chromic anhydride) is a powerful caustic.

Acidum Hydrobromicum contains 10 per cent. of real hydrobromic acid.

Acidum Oleicum is a useful solvent for many medicinal substances, and is readily absorbed by the skin. It is, of course, necessary in the preparation of the oleates.

Acidum Phosphoricum Concentratum contains 47 per cent. of phosphoric anhydride.

Acidum Salicylicum, so extensively used as a febrifuge in human practice, and sometimes by veterinary surgeons, is now officinal.

Aloes.—Two new varieties of aloes (Curaco and Zanzibar) are recognised, and aloin is now officinal.

Alumen.—Both potash and ammonia alums are recognised instead of the ammonia alum in the last pharmacopœia.

Ammonii Chloridum (Sal ammoniac).—The granulated, as well as that in tough masses, is now recognised. The granulated is by far the most convenient in practice.

Argenti Nitras.—The fused nitrate of silver in sticks is now officinal, as Argenti et Potassii nitras, or mitigated caustic. It consists of nitrate of silver 1 part, fused with 2 parts of nitrate of potash. Toughened caustic is fused silver nitrate, containing 5 per cent. of $K NO_3$.

Asafœtida.—The orthography of this has been changed, and it is now spelt with one "*s*" instead of two, as formerly.

Croton Chloral Hydras is now named Butyl-chloral Hydras.

Calx Sulphurata is a mixture of sulphate and sulphide of calcium, and should not contain less than 50 per cent. of sulphide. It is principally known as sulphide of lime (Calcii sulphidum), to which it owes its medicinal virtues. It is given in boils, suppurative and glandular affections, etc.

Cinchonas.—The alkaloids may be prepared from any of the cinchonas, but the galenical preparations are ordered to be made from the red bark, which is now standardised, and must yield 5 to 6 per cent. of alkaloids, not less than one-half of which shall consist of quinine and cinchonidine. This is the bark most suitable for general practice, and being standardised may be relied upon for uniformity.

The sulphates of cinchonodine and cinchonine are officinal.

Coca, and several preparations thereof, now find a place which will be noticed hereafter.

Decoctions and Plaisters claim no notice, as they are seldom or never used by veterinary surgeons.

We next come to an important and useful class of preparations —the *Extracts*—and in them we have changes and additions which demand our attention. To the thirty-seven extracts in the last British Pharmacopœia, ten new ones are added.

Of the previously officinal extracts the following have undergone alteration :—

Extractum Cinchonæ Liquidum is now made from the red bark, and standardised to contain 5 per cent. of alkaloids. One fluid ounce of this extract is equal to one ounce of bark.

Extractum Ergotæ Liquidum is same strength as formerly, but made by an improved process, said to produce a more reliable preparation. Ergotine has also been made officinal.

Extractum Nucis Vomicæ.—This is the most important and satisfactory change of all the extracts. It is made by an improved process, and its alkaloidal strength must be 15 per cent. It will thus be a most powerful and reliable preparation in cases requiring nux vomica. It is very convenient to dispense in balls, and for all practical purposes 20 grains of extract may be considered equal to 3 grains of strychnine.

Extractum Belæ Liquidum.—One ounce of this extract is equal to one ounce of Bael fruit. It is a very valuable astringent, and too little known in veterinary practice.

Of the new extracts the following are all those likely to be employed :—Belladonnæ alcoholicum, Cocæ liquidum, and Jaborandi.

Extractum Belladonnæ Alcoholicum.—This is a new introduction, but the old green extract is still retained. The alcoholic extract is prepared from the *root*, and is stated to be five times as strong as

the green extract made from the leaves and young branches. It is important to bear this difference in mind in prescribing these preparations.

Three new solutions in glycerine are added, all likely to be useful in veterinary practice.

Glycerinum Aluminis is 1 in 5.

Glycerinum Plumbi Subacetatis is same strength as "Goulard's Extract," is said to keep better without depositing, and is preferable to Liq. plumbi diacet.

Glycerinum Tragacanthæ, one of the most useful excipients in the pharmacy for compounding balls, pills, etc. It will be found advantageous, in practice, to keep a thinner paste than the pharmacopœial preparation.

The *Infusions* have undergone some change, but as they are impracticable unless in the concentrated form, we pass them unnoticed.

Hypodermic Injections.—Two new ones are made officinal—Apomorphiæ and ergotin. Both are ordered to be freshly prepared as required for use. The strength of morphia injection is altered from 1 grain in 12 minims to 1 grain in 10 minims.

Iodiformum, and an ointment thereof, are officinal.

Liniments.—No change of practical importance.

Liquores.—Ten new solutions are added, and one omitted. The solutions of arsenic, morphine, strychnine, permanganate of potassium, and arsenite of soda, have been altered from 1 in 109 to 1 in 100, which is equal to about $4\frac{1}{3}$ grains in each fluid ounce, or 1 grain in 110 minims.

Liquor Iodi is a little stronger, and now contains 5 per cent. of iodine. This is a very useful preparation, stronger and cheaper than Tinct. iodi.

Liquor Ferri Perchloridi is equally efficacious, and less expensive than Tinct. ferri perchl.

The new liquors of importance are :—

Liquor Acidi Chromici is a solution containing 25 per cent. of chromic anhydride, or strength 1 in 4. Of this strength it is a powerful caustic, but of half this strength it is said to be "serviceable in the treatment of Grapes and Grease." (Gresswell.)

Liquor Ammonii Acetatis Fortior.—This strong solution of acetate of ammonia is the best and most convenient for veterinary use. When diluted with five parts of water it forms Liq. ammon. acet.

Donovan's Solution, or Liquor arsenii et Hydrargyri iodidi, is now officinal, and contains 45 grains each of iodide of arsenic and red iodide of mercury in 10 oz. of liquor.

Liquor Ferri Acetatis, and *Liq. Ferri Acet. Fort.* are officinal.

(*To be continued.*)

ACNE CONTAGIOSA IN THE HORSE, AND ITS ETIOLOGY.

BY PROF. W. DIECKERHOFF AND DR. P. GRAWIZ.

(*Virchow's "Archiv," vol. cii., p.* 148.)

THE authors have been studying a skin disease in horses imported from England, particularly in well-bred animals, which has been called hitherto "Englische Pocken" (English Pox), but which they describe as Acne Contagiosa. The new nomenclature has been adopted to counteract a widely-spread idea that the disease is genuine Horse-pox. Concerning the diseases which may be mistaken for Acne Contagiosa, the following remarks are worthy of notice:—

1. The authors hold that it has not been proved that horses are subject to genuine Variola. Tenner was the first to conjecture that the connection between Stearrhœa (Grease) and Variola Vaccina was so close, that by inoculating a cow from a horse suffering from Grease, Cow-pox might be produced. Tenner's opinion led to the belief that Horse-pox was a special form of Grease. Many authors, such as Loy, Sacco, Viborg, take this view. Viborg, indeed, considered he had actually demonstrated the correctness of his assertion, by producing an eruption in cattle by inoculating them with the exudate of Grease.

Against this view the authors maintain that the mere occurrence of pustules, after an inoculation, is no proof of the identity of the disease produced with that from which the inoculate has been taken; but more probably the outbreak is a consequence of inflammation of the skin, as often results from the inoculation of virus.

2. Stomatitis Pustulosa Contagiosa (Eggeling and Ellenberger) differs from Acne Contagiosa, mainly by the course it runs.

3. A pustulous exanthema occasionally occurs in the neighbourhood of sloughing wounds. It spreads sometimes, but is benign in character.

4. A pustulous exanthema may occur from a high temperature in summer, which vanishes when cooler weather sets in.

5. Parts touched by harness in riding and draught horses sometimes show a number of small knots; these are furunculi.

Acne Contagiosa is an eruption of numerous groups of pustules, principally in parts covered by harness and their immediate neighbourhood. The reason why these localities are chiefly attacked lies in the mode of infection. The disease is generally conveyed by the harness of diseased horses. It is carried to

adjacent parts, by the brush and currycomb, from the original crop. In average cases an exanthematous eruption occurs two or three days after infection. A round or oval inflamed area is formed, the hair becomes rough and moist, the skin is tumefied, and in a few cases a somewhat sticky serous exudate is thrown out. If the skin be thin, suppuration may take place, in which case from one to twenty pustules are formed. After five to eight days these pustules dry up, and under the crusts granulations are found, which lead to cicatrisation. The skin between the pustules remains smooth. Should the pustules be very close, sphacelus of skin may occur, in which case the dead tissue is thrown off as a slough. As a rule, the parts heal completely in from ten to twenty days. Only rarely does the process involve the subcutis; when this occurs, Lymphangitis ensues, and runs its course in four to six weeks, terminating in cicatrisation.

The diameter of the parts affected varies, according to the number of pustules, from 2 to 8 cm. The complaint is entirely local; no constitutional disturbance is witnessed. The itching is slight, and only occurs during the healing process. Treatment is confined to the isolation of the diseased, and washing of the affected parts with Liq. alum. acet., or with a lotion composed of Plumb. acet., 2 parts; Alum. crud., 1 part; Aqua dist., 50 parts.

An average case, if properly treated, is cured in about four weeks; but it may last from eight to twelve, through fresh crops of exanthems growing from neglect of treatment.

The authors conclude, from the spread and course of the disease, that it is caused by a contagium; in fact, the examination of the scabs demonstrated the presence of numerous micro-organisms. Of these the pure cultivation was undertaken, which produced the characteristic exanthems when inoculated. A bacillus was identified as the *raison d'être*, and is being accurately studied. Horses, calves, sheep, rabbits, and guinea pigs are susceptible to the disease; house mice, and white and field mice, are proof against it when it is applied to the skin. For further details and diagrams of the bacillus, we must refer to the original communication.

Editorial.

A SHORT-SIGHTED POLICY.

THE Indian Government, in direct opposition to the Horse Guards and War Office, has determined to reduce the veterinary service in India by a comparatively large number of officers, and evidently at once. Anything more short-sighted or injurious to the best interests of that country can scarcely be conceived. The only charitable construction that can be put upon the decision arrived at, and which is being acted upon, is that the officials concerned in the transaction have lost their common sense and become possessed of a silly kind of *dementia*, of which they will be cured, perhaps, by a very severe revulsive treatment. India has been particularly unfortunate in its veterinary relations. No country in the world, we are certain, suffers more from the most serious animal diseases of every kind—Cattle-plague, Anthrax, Glanders, Rabies, Sheep-pox, Foot-and-Mouth Disease, among them—and it has been estimated that, at the least, animals of the value of six millions of pounds are lost annually from preventible maladies. Need we wonder that, from this one cause alone, this great country—the mainstay of which is agriculture—is every year becoming less wealthy and more harassed by taxes. If the British public only knew how affairs are managed in this respect, a change for the better would be quickly effected; but, unfortunately, such things do not reach the ears of our reformers, and crying evils demanding immediate redress are allowed to exist from year to year.

The rulers of India seem to be unable to learn anything from bitter experience. The terrible losses and horrible cruelties inflicted upon animals in Afghanistan, through the most culpable neglect or indifference in providing proper veterinary attendance, would, one might imagine, have taught people, even if only half-witted, the necessity for providing a sufficiency of veterinary officers to meet, at least, ordinary requirements. But no, such instruction is thrown away in that country of "Kismet"; and it will astonish our readers to know that for an expanse of territory not inferior in extent to Europe, infested by the most devastating horse and cattle diseases, there are fewer veterinary surgeons than are to be found in Lancashire, and that small number is now being made smaller. It may be that the authorities who control the veterinary arrangements in India imagine that they are effecting a saving in keeping the establishment of veterinary surgeons so low as to render it all but ineffective. If such is their idea, it only shows how purblind they are, and how incompetent they must be to govern such a country. If saving is to be really accomplished and India benefitted, a commencement should be made with those who draw enormous salaries, out of all proportion to the value of the work they do; and instead of reducing the veterinary staff—the most useful and hard-worked body of men in that country—it ought to be doubled or trebled. So badly treated and so cruelly overtaxed by hard work are the veterinary officers, that the only wonder is they serve in that country at all. Leave is impossible, and nothing

but a serious break-down in health, which is often permanent, will gain for them a respite. The amount of invaliding is very great, and those who come home look with the greatest dread to returning again to that unhealthy climate, where to be worked to the verge of death is the only prospect before them.

Should a war occur soon, a heavy catastrophe is inevitable, and the only thing that will avert the impending danger is a collapse in peace time. Such cannot be far off, and the sooner it comes the better for India. The only matter for regret then will be, that those who gave such pernicious counsel will escape the punishment they so richly merit.

Jobbery is far from being unknown in the land of rupees, and jobbery is generally successful in concealing such mishaps, especially when due to ignorance or gross mismanagement. As an instance of this, and of the way such things are managed there, it may be mentioned that an officer possessing no qualification whatever for the post, but having a friend at Court, is about to be pitchforked into the position of superintendent of horse-breeding operations—a situation demanding special technical knowledge and ability, and which has hitherto been held by a veterinary surgeon. If the whole business of veterinary service in India were not so momentous and grave with regard to the welfare of that vast region, and indirectly to the British Empire itself, we might be inclined to look upon it as a farce; as we consider it to be, as it always has been, a disgraceful failure. The subject is well worth the attention of Parliament, and sadly wants thorough investigation.

FOOT-AND-MOUTH DISEASE.

SOME interesting researches have recently been published on Foot-and-Mouth Disease, which considerably advance our knowledge of its etiology, and afford indications as to prophylactic treatment. The first report, in order of time, is Italian, and was published a few months ago in the *Clinica Veterinaria*, and is from the pen of a veterinary professor, Dr. Nosotti.

The initiative of the researches made on this disease belongs to the Agricultural Committee of Pavia, who, alarmed by the frequent outbreaks of that epizootic in Italy, had established a commission to study its progress and nature. Dr. Nosotti belonged to that commission, and reported the result of the investigations.

In a first report the commission had concluded that:

1st. The microscopic examination of the aphthous liquid obtained directly from a vesicle still intact, brought out the discovery of epidermic cells, some blood corpuscles, and numerous microbes, similar to those already discovered by Professor Rivolta, which are alone the cause of the virulency of Foot-and-Mouth Disease, and which ought to be called *Micrococcus aphtosus*.

2nd. Cultures of this micro-organism have been made successfully.

3rd. A great extension ought to be given to the system of inoculation as already practised by many, from Buniva down to Rossignol.

4th. Subcutaneous inoculations, made either with pure virus or with virus diluted in the aqueous humour of the eye, have for their result to diminish the intensity of the disease.

These conclusions being presented, Dr. Nosotti states that the study of this *Micrococcus aphtosus* has been made by others and by himself, and that

these studies have proved that the virus of aphtha is cultivable, and probably can thus be attenuated in its effects.

While studying the nature of the virus, Dr. Nosotti made numerous experiments in inoculation, as above stated. These were all made under the skin of the dewlap, and they were followed by a benign attack of the disease, with the appearance of aphthous vesicles preceded by slight fever. These vesicles appeared on the buccal mucous membrane, were smaller than in the ordinary form, and cicatrized generally by simple resorption ; but when they ulcerated, the recovery began as soon as the membrane was ruptured. It was also observed that the skin of the region where the inoculation had been made, became the seat of an inflammation of a phlegmonous nature, which was soon covered by numerous little aphthæ.

Six months later the same commission published a second report, describing the experiments of inoculation made in various localities. The virus then used was diluted in aqueous humour, and was pushed in the dewlap with a Pravaz syringe. It was hoped that by this process the affection would be localised in the region of the dewlap, and its development in its ordinary place of selection would be prevented. At first these results were obtained, but a few failures brought on a discussion between the members of the commission and Dr. Nosotti, and it is for this reason that the author published the report as merely the result of a few experiments made by himself ; definitive results have not yet been reached.

In order to prosecute his investigation successfully, Dr. Nosotti took all the precautions possible, providing himself with the best instruments and familiarising himself with all that has been written on the subject of micro-organisms. He first learned that the existence of the microbe of epizootic aphtha had been discovered long ago, thus : Haidinger claimed that he had found in all the vesicles a kind of fungi which was the analogue of the fungi of rusty plants ; Betti claims that this is the *Oidium albicans* or *Mucor albicanus* of the "thrush" of children or young calves ; Bender found in the envelop of the aphthæ small fungi, very small spores, and also numerous microbes ; Bollinger found in these vesicles bacteridæ and bacilli ; and Rivolta, more careful than the others, says that the aphthous virus is composed of round microbes of very small size, the largest having a kind of central nucleus. All these observers, as Nosotti remarks, had examined impure vesicles, that is those mixed with detritus of all kinds, which soil the mouth, the udder, or the interdigital space, and therefore the number of parasites which they found was not to be counted; consequently, their researches could not be correct.

By avoiding their errors, Dr. Nosotti obtained the virus from recently-formed vesicles, and took it with a Pravaz syringe, previously carefully disinfected. The liquid obtained by this method was like serum, had a slightly citrine colour, was viscous, had an alkaline reaction, and a fresh, not unpleasant, *sui generis* odour. Left in a glass tube, it becomes transformed into a mass resembling coagulated albumin, and when the glass is agitated, the liquid disappears entirely.

Comparing it with the virus taken from an old vesicle, this is found to be of a dirty-white colour, cloudy, with an acid re-action, with a strong and disagreeable odour. It contains impurities and detritus, which collects at the bottom of the glass, and does not disappear when it is agitated.

Seen under a microscope, the pure liquid is found to be composed of epidermic cells, red corpuscles, white corpuscles, fat cells, protoplasmatic granulations, and numerous vibrios and *micrococci*, with well marked brownian motions.

In the old virus, besides all the above, Dr. Nosotti found numerous purulent cells, cellular organic detritus, rudimentary forms of *Bacterium termo* or bacillus of putrefaction.

In using colouring tests, such as fuschine, violet of gentian, etc., Dr. Nosotti observed that the morphological elements become more apparent, and that numerous microbes could be detected, which were those of epizootic aphtha. Their diameter is very small ; at first sight they resemble those of Fowl-cholera, discovered by Pasteur, but they differ from them in some points, mentioned later on.

Perfectly round, strongly reflecting light in their centre, their outlines are well defined. They are generally single, seldom grouped by two, three or four, never in chapulet form. With very high power, by close observation the various steps of reproduction can be seen. Some of them have a kind of granulation, which becomes more and more apparent as it grows to the dimensions of the microbe from which it arises. This microbe with granulations then assumes an elongated shape; then between the granulations and the primitive microbe, a contraction or fissure occurs, and the body assumes the shape of figure 8, which is, in fact, two microbes united together by a thin membrane, which soon breaks up very readily by the simple motion of the fluid. These microbes are also seen in the epidermic cells and the leucocytes.

To be certain of the parasitic nature of these microbes, Dr. Nosotti treated them with acids, alkali, ether, and iodoform. But these agents, instead of causing their disappearance, intensified their appearance, though they seemed to have lost some of their energy. Mixed with the bacteridæ of putrefaction, they seem to experience no effect from them, and even their multiplication proceeds with scarcely any interference. They disappear only when the bacteridæ of putrefaction are very abundant.

Placed in proper media, the microbe of Foot-and-Mouth Disease multiplies prodigiously ; its vitality is so tenacious that it multiplies also, though but slowly, when exposed to free atmospheric air.

In order to demonstrate that aphthous virus is truly the virulent agent of Foot-and-Mouth Disease, numerous cultures in appropriate liquids have been made in Italy, but principally on a large scale in the laboratory of Dr. Nosotti.

From the numerous observations he has made, he believes himself justified in affirming : *that the microbes observed first by Professor Rivolta, and better studied, and for the first time cultivated by himself, represent the true cause of epizootic aphtha, the essence and nature of the aphthous virus.*

To confirm the virulency of his cultivation, Dr. Nosotti has inoculated adult animals, and has succeeded in producing in them a benign aphthous fever.

After reporting a few experiments, probably too few to justify a thorough conclusion, Dr. Nosotti concludes his report by declaring :

1. That epizootic aphtha is not a disease susceptible of developing itself spontaneously. It is not an indigenous, but an exotic disease.

2. Its nature is eminently contagious.

3. Its virulent element is represented by microbes, discovered first by Rivolta.

4. The virus can be cultivated when placed in appropriate media; and by reducing its virulency by successive cultures, it may become a safe and proper agent of inoculation.

The next researches to notice, are recorded by Dr. Klein in *The Lancet* for January 2nd. He writes :

For some time past I have been engaged in an inquiry into the etiology of Foot-and-Mouth Disease carried out for the Medical Department of the Local Government Board, and I have ascertained that this disease is caused by a micrococcus, which I obtained by cultivating artificially the lymph taken from the vesicles of a sheep affected with this disease. This micrococcus is present in the lymph and in the tissue of the vesicles as dumb-bells and as

chains. It grows well in alkaline peptone and broth, in solidified blood serum, in solid agar-agar peptone broth mixture, in solid nutritive gelatine mixture (which is not liquefied by it), and in milk. Its mode of growth in solid media is so typical and characteristic that by the naked-eye inspection alone it can easily be detected. When any of the above solid media is inoculated with this micrococcus, after several days a thin limited film makes its appearance at and immediately around the point of inoculation ; this film slowly spreads, but from the outset and afterwards presents a very characteristic appearance to the unaided eye, being in fact *a collection of closely-placed minute granules or droplets*. These gradually and slowly enlarge, and assume a whitish, translucent character. If the inoculation is made with the point of a needle or platinum wire, or of a capillary pipette, pushed into the solid medium, the channel of inoculation becomes, after several days to several weeks, marked as a linear aggregation of minute granules or droplets ; in addition to this there is on the surface the above-mentioned film of granules starting from the point of inoculation. The growth of this micrococcus is extremely slow ; in solid nutritive gelatine mixture, kept at temperatures from 18° to 22° C., the first traces of the growth in the shape of a small cluster of transparent granules visible under a lens are noticeable at the end of from five to eight days, or even later ; in agar-agar mixture, kept at 35° to 38° C., it is of course sooner visible, but even after six or seven months, in all media and under all conditions, the growth remains of limited extent. Also in milk, kept at temperatures varying between 35° and 38° C., the progress of the growth is extremely slow ; the milk retains perfectly its natural aspect and condition ; no curdling occurs, although the reaction becomes distinctly acid.

In artificial media the micrococcus forms, besides dumb-bells (diplococcus), beautiful chains (streptococcus). These differ in length according to the number of micrococci composing them, the short chains being a linear series of four, six, or eight micrococci, the longer ones of more than eight up to thirty and more micrococci. The longer chains are always curved, and even convoluted. The above-mentioned characteristic granular appearance of the growth is owing to the presence of smaller or larger masses of chains matted together.

Subcutaneous inoculation with artificial cultivations produces no perceptible disorder, but by *feeding* sheep with them—with a twentieth generation *the typical disease has been reproduced*—viz., vesicles and ulcerations on the feet. From the vesicle of such an animal lymph was obtained which, on cultivation, yielded the same micrococci, characterised by the same slow growth and the same typical general appearance as those used for the experiment. There can, then, be no question about the identity of this peculiar micrococcus with the cause of the disease.

Five sheep have been subcutaneously inoculated with active cultivations of the micrococcus, but neither locally nor generally was there any definite perceptible change produced. Subsequent feeding of these same sheep with the active micrococcus had no result. I conclude from this that a previous subcutaneous inoculation with the micrococcus provides the animals with immunity against the disease. I hope soon to be able to test this point on a larger series of animals.

Subcutaneous inoculation of the same micrococcus into guinea-pigs produced no result ; feeding was followed by death after from two to three weeks. Out of six animals which received with their food a small quantity of milk containing the micrococci, three died—one from ulceration and perforation of the upper end of the duodenum, and two from ulceration and perforation of the large curvature of the stomach.

THE CONTAGIUM OF INFLUENZA *(INFLUENZA PECTORALIS)* OF HORSES.

BY PROFESSOR A. LUSTIG, VETERINARY SCHOOL, HANOVER.

PROFESSOR LUSTIG cultivated six different species of microbe from freshly inflamed lung, pleural exudate, and amber-coloured nasal discharge of horses which died of Pneumonic Influenza. According to him, the contagium is contained in a yellow-coloured cultivate of the smallest ovoid bacilli. They appear, when stained in the usual way with gentian-violet, to consist chiefly of micro- and diplo- cocci, but when treated with dahlia solution (saturated dahlia sol. in 100 parts of water, alcohol 50 parts, and glacial acetic acid 12½ parts), their true bacillar form becomes apparent. These are the bacilli of Influenza.

The cultivate has a dry, dull, granular surface, grows, as a rule, very slowly by the projection of rounded prolongations, and while undergoing this process, it also increases in thickness. It vegetates only in the presence of air.

In sealed cultivation, growth takes place upon the surface of the medium only, and not unless the atmosphere is allowed to enter the vessel through some separation in the gelatine. These microbes belong, therefore, to the atmospheric order. By cultivation from the blood or watery pleural exudate of severe cases of Influenza, in Koch's flesh-pepto-gelatine medium, by the covered method, Lustig grew in several cases all, in others nearly all, his six different cultivates; but in isolated instances he could produce nothing; in some he only obtained the yellow cultivate.

He injected this last into the connective tissue of the chest of a healthy four-year-old horse. The result was extensive inflammation and painful œdema, which became more and more circumscribed, harder, and less painful. After fourteen days had elapsed, the swelling burst, and a "lymphatic," reddish fluid escaped, containing yellow and white flakes.

The yellow cultivate acts, therefore, as Lustig asserts, pathologically upon horses, and in fact is the contagium of chest Influenza.—*Centr. Blatt f. d. Med. Wissenschaft*, 1885, No. 20.

THE CASTRATION OF CRYPTORCHID HORSES (SPITZ-HENGSTEN).

BY L. NIELSEN, VETERINARY SURGEON, AARHUS, DENMARK.

(*Continued from page* 31.)

The Method of Operating.

Before operating, the bowels should be as empty as possible, and the rectum cleared out—*i.e.*, the animal should have fasted for about twenty-four hours, and a clyster administered about an hour before operating. This, however, is difficult when the horse is not under the immediate care of the operator, because owners will not let their animals fast so long.

If the testicle lies immediately on the inner side of the ring, it does not much matter whether the bowels are filled or not; but if one has to seek for the cord with the finger in the abdominal cavity, then it is important they should be empty, as they are easier kept out of the way in that state, especially as the bowels are much more forcibly pressed against the abdominal wall when an animal is cast and fixed for the operation than when standing; also, hernia is much less likely to occur when the bowels are empty than when they are distended with food.

After the animal has been thus prepared, he should be cast so that the side

to be operated upon is uppermost. It is advisable, if possible, to choose a place where the ground is sloping, so that the head can be placed lower than the hinder parts, whereby the intestines are thrown forward, away from the pelvis. We usually operate under chloroform-narcotism, 1-2 oz. usually being sufficient. The scrotum is then thoroughly washed with soap and carbolised warm water. An incision about 10 cm. long is made through the skin immediately anterior to the border of the pubic bone, but nearer the limb than the scrotum—in fact, at the point where the abdominal wall feels the thinnest. This incision should be made through the skin when it is folded, so that the small vessels which lie under the skin are not wounded. There is a vein running from the limb to the middle line of the body, just at the point where the incision is usually made, and if this be injured considerable hemorrhage takes place, and interferes with the operation. The subcutaneous tissue is then broken down by the forefingers ; this is easily accomplished, and produces no hemorrhage, which must, during the whole operation, be avoided, if possible.

The operator should now satisfy himself whether the testicle lies in the canal or abdominal cavity. If he is satisfied that it lies in the latter, the abdominal muscles must be divided by the fore and middle fingers, and, at the same time, the peritoneal lining, by a quick and forcible jerk of the finger, quickly divided, so that it is not torn from the muscles beneath. This forcing is usually easily accomplished ; however, the yellow abdominal fascia (*tunica abdominalis*) is sometimes so thick that the fingers must be passed somewhat slantingly, in order to get through it. The wound through the subcutaneous tissue, the abdominal wall, and the peritoneum must be as straight and regular a canal as possible. If the horse is not fat, and the wound straight, the abdominal cavity can be easily reached by the finger. An oblique wound is usually due to the yellow tissue resisting the passage of the finger through it, or the finger may get into the inguinal canal ; in which case the finger is not long enough to reach the cavity. In one such case we had to pass the whole hand into the abdominal cavity before the vas deferens could be found.

According to the above description, the normal direction for the wound canal is that the external (wound) opening is immediately in front of the inguinal ring, and then passes the shortest way through the abdominal wall, so that the inner (wound) opening is somewhat nearer the middle line than the internal ring. The opening should be as small as possible, only room for the two fingers to pass in ; the danger of the operation being in proportion to the size of the wound that is made.

As soon as the abdominal walls are pierced through and the fingers are in the abdominal cavity, a clean sponge should be placed around the fingers, to soak up any moisture, and prevent the air from entering the cavity as much as possible. The fingers are then moved about in all directions to seek for the testicle ; first along the wall of the abdomen, for it is often found in the neighbourhood of the internal ring. However, it is usually not so easily found ; for, if the horse lies on its back, the testicle frequently falls on to the intestine beneath it, and its position can be so different that it is difficult to find it, and frequently impossible, with the two fingers. In this case the vas deferens must be felt for, and this always lies posteriorly to the wound. If the horse is not fat, nor the intestines full, the vas deferens can usually be easily detected by the fingers being passed backwards. C. R. Jensen and J. S. Petersen have observed that the intestine, ureter, etc., can be touched and handled without the animal evincing any signs of pain ; but as soon as the testicle or vas deferens is felt, the animal immediately begins to struggle, and becomes restless, also the vas deferens is pulled away. Although I usually operate under chloroform, I have also observed the horse to be rest-

less, and struggle when I catch hold of the cord. This is a sign that we have got what we require, and it must be held firmly ; because it frequently happens that it is enveloped in a duplicature of peritoneum, which makes it difficult to retain and withdraw through the operation wound. When it is withdrawn, the operator must carefully draw it further, when the testicle will follow ; for, if the wound canal is large enough to allow two fingers, it is usually large enough to let the testicle pass through. Should the operator get hold of anything and draw it out, and not know what it is, he must put it back again. However, it often happens that it is the very thing you have been seeking for.

If the testicle cannot be found, it may be necessary to pass the hand itself into the cavity, although this is very rare. This only happened to us once, and that was when the wound canal was made slantingly, on account of the toughness of the yellow abdominal tissue. However, no bowel came down, and the horse got well.

That it is sometimes necessary to pass the hand and arm into the abdominal cavity, as has been asserted by some castrators, is extremely doubtful, since the testicle always lies nearer the abdominal wall than the lumbar region. J. S. Petersen says that the testicles are never found in the lumbar region. C. R. Jensen sought in vain for the testicle in the lumbar region in one case, but, as he was withdrawing his hand, he felt the gland on the side of the abdominal wall.

After the testicle is drawn outside of the wound, a pair of clams are placed on the spermatic cord. The clams are small ones, about 9 cm. long ; no caustic is used, but the clams are well cleaned and disinfected. A stitch is then put through the wound in the skin, both in front and behind the clams, in order to prevent any escape of intestine. The animal is then placed on his side, and the hobbles, etc., removed. He generally remains lying for about fifteen minutes longer before the effect of the anæsthetic ceases, and then he gets up. The animal is then usually a little unsteady in his gait, and sweats profusely ; this, however, passes off in about an hour, and his appetite returns. We have operated upon some who have appeared none the worse directly they have been allowed to rise, and which began to eat as soon as they reached their stable. The time usually occupied in casting, chloroforming, and operating, is half an hour.

After the operation is over, the animal should be brought into an airy, but not draughty, stall, and be so placed that the hinder parts are higher than the fore during the first twenty-four hours. The water should be limited, and the food (green meat, if possible) only in about a quarter the quantity usually given to a healthy horse. After twenty-four hours, the clams may be removed, and the cord let loose and placed inside the wound of the skin. Sometimes swelling takes place around the wound, and the stitches break through ; at others, they remain till next day, when they should be removed, and the edges of the wound brought together without interfering with the edges of the cord, so that it remains in the wound canal. We believe that the cord remaining in the canal assists largely in preventing the intestines protruding. Stockfleth removed the clams ten hours after operating, and pushed the cord into the cavity ; an hour later the intestines came through the wound, so that the animal had to be re-cast and the clams re-applied. They remained on six days, but the animal died on the eighteenth day after the operation, from Peritonitis.

The animal is usually feverish the day after the operation, which reaches its highest point on the third day. The after-treatment consists in washing the parts daily with tepid carbolised water, complete rest for the first four or five days, and feeding with green-stuff. When the fever has subsided and the animal appears only slightly incapacitated, he may be placed in a loose

box, or a little exercise given. But so long as the fever is high and the animal is generally ill, exercise must on no account be allowed, as it tends to increase the fever and stops the appetite. Most of those cases operated upon by us recovered in from three to four weeks.

The operation of cryptorchid castration is carried out under the necessary antiseptic precautions. No covering, however, should be used ; but the hands, instruments, sponge, etc., must be scrupulously clean and disinfected. We have only used the carbolised spray twice, and on both occasions the horses died three days after the operation, from Peritonitis.

In three cases we placed a wadding covering, sprinkled over with iodoform, around the cord, before placing it in the wound canal ; and no cases could go on more satisfactorily, although the wadding prevented the wound being properly stitched up. Therefore, we should recommend that the iodoform powder be sprinkled in the canal only, and then the stitches applied in the usual way, as we have described above.

In the majority of stallions reported to be cryptorchids, the testicle is found lying in the tunica vaginalis communis, in the inguinal canal. Out of fourteen true cryptorchids we have operated upon, twelve were successful and two died. The latter were the two first we operated upon, mentioned above. These were operated upon at the Veterinary School, with the assistance of a colleague, in the following manner :—The incision was made in the usual place, immediately in front of the pubic bone, first through the skin, then the tissues and the muscles ; and as we did this, much blood flowed, which we endeavoured to stop by torsion, or by tying the arteries as we severed them. This, of course, took a long time. After we had withdrawn the testicle, the cord was ligatured by catgut and the ends cut close to the knots tied on the cord, and the testicle removed with the knife. The whole operation being performed under the carbolised spray, the result was very unsatisfactory ; the operation lasted long, and the animals died three or four days afterwards from Peritonitis. Therefore we abandoned this method, and now carry out that mentioned in the foregoing pages. The same appears to be the experience of others also.

Of the twelve cryptorchids operated upon successfully, two showed signs of Peritonitis on the third day, but fortunately recovered. Three suffered from inflammation of the cord, but kept feeding all the time, and recovered. One had a large abscess form in the inguinal region a month after the operation, but soon recovered, and in six months was quite well. Another, long after the parts had healed and the horse had been worked, showed an inguinal hernia on the side operated upon, but it in no way interfered with the animal's usefulness. Four of the cases were operated upon in the Veterinary Institution, and there remained until convalescent. The other eight were operated upon in different parts, of the country. The later operations were performed quicker and did better, than those first undertaken by us. We have never seen the bowels "come down" during or after the operation.

Stockfleth has operated in various ways, by the flank, through the inguinal ring, and by the above-mentioned method of incision in front of the pubic bone (laparotomy). He has not published the results of all his operations, though privately he has told us that he has lost 33 per cent. ; but we must remember his operations were conducted with the view of proving the value of the different methods of operating. He says the cause of death was Peritonitis, and it generally took place eight or nine days after operating.

C. R. Jensen operated after our method, but used a caustic clam instead of a plain one, and removed it eight or ten hours after operating. He never had protrusion of intestines or Tetanus follow. He operated upon several cryptorchids each year, and during fifteen years has only lost three ; therefore we may say he has been very successful.

J. S. Petersen had another method. He usually pressed through the ring, or through an incision near it, into the abdominal cavity. In a few cases he operated after our and other methods, nearer the middle line. The spermatic cord was sometimes trapped in clams and sometimes bound by waxed yarn. Latterly he has only used the latter method, leaving the ends of the yarn long enough to hang out of the wound. The wound was not stitched up. From 1867 to 1872 he operated upon twenty-six cryptorchids, six of which died—viz., three from protrusion of intestines, one from Acute Peritonitis, one from Chronic Peritonitis, and one from Tetanus. This death-rate, however, is too low, because it was found that, within four months after the operation, half of those he operated upon died. From 1873 to 1878 Petersen operated on twenty-five cryptorchids, between the ages of two and four years old, eight of which succumbed—32·5 per cent.¶ In one an intestinal fistula showed itself fourteen days after the operation, through which the contents of the intestines flowed ; this horse was destroyed.

Another question arises—viz., if an animal has one testicle "down," normally, in the scrotum, and the other in the abdominal cavity, ought they both to be removed at the same time? Stockfleth once operated in this manner. He first extracted the testicle from the abdominal cavity, and placed a clam on the spermatic cord, stitched up the wound in the skin, and then proceeded to remove the normally-situated gland. During the last operation the horse struggled, when a sharp, whistling noise was heard, as though air was being sucked through an opening. On examining the operation wound, a loop of intestines had been forced through the wound in the abdominal muscles under the skin. The stitches in the skin were therefore removed, the bowel replaced in the abdominal cavity, and deeper and stronger stitches supplied. The animal recovered. Stockfleth came to the conclusion that it is better to allow the animal to recover from the one operation before the other is attempted. Moreover, an animal with one testicle may have more strength to resist the ill-effects of the other being removed. C. R. Jensen also removed both testicles from a two-year-old "rig" at the same time. The animal was much weakened, and was slow to recover. We have never removed both glands at once, although we have been frequently asked to do so ; but have always refused, saying that the animal must remain for a month or two longer.

We have never had an opportunity of seeing a horse with both testicles in the abdominal cavity (anorchids). J. S. Petersen, however, castrated two such animals at one operation each, but both died.

H. C. Jensen also operated on two, both of which recovered. C. R. Jensen has operated on two such cases, removing only one gland at a time, and in one case allowing a month to elapse after recovery from the first before he attempted to remove the second, and the operation was successful. In the other he allowed six months to elapse between the two operations, but the animal succumbed to Peritonitis. This may have been due to the fact that Jensen had in this case to pass his hand into the abdominal cavity in order to find the testicle.

There are cases recorded in Danish literature where the testicles have been removed through an opening in the flank, but above half of such cases ended fatally. In the others the wound in the flank healed slowly, and the treatment after the operation was carried out with difficulty. This method, therefore, has ceased long ago, and, as far as we know, has not been recently tried ; in fact, not since Stockfleth pointed out, in 1866, the advantage of making the incision immediately anterior to the pubic bone.

FLUID EXTRACT OF MUSTARD

THE value of mustard as a counter-irritant is well known in veterinary practice, it being at once the promptest, safest, and least annoying to the animals to which it is applied. Unfortunately, none of the preparations of mustard—such as leaves, which have been introduced for use in human practice—can be made available by veterinary surgeons, who are compelled to resort to the powder or flour, and mix it with water when they require to apply it. This is neither a cleanly nor a convenient way of employing mustard, and if the article has to be carried its bulk is an objection; in addition to which, unless kept dry and in a carefully closed receptacle, it soon becomes deteriorated. All these disadvantages are obviated in the preparation of mustard which M. Savary, of Amiens, has introduced, and which cannot fail to be greatly appreciated by veterinary surgeons in this country. The French Ministers of War and Agriculture have adopted it in their several departments, and it is employed in the hospitals of the veterinary schools of France, as well as in the Paris omnibus and cab companies, and in other stables in that country. So valuable are its properties, and so great the advantages to be derived from its use, that after careful trial it has been adopted by the Veterinary Department of our Army, to which it will prove a great boon, especially on board horse-transports and in the field, no less than in barracks or on the march at home. It can be utilized at once, and while it may be applied so that it will act more speedily and powerfully than the ordinary mustard plaster or cataplasm, it can be so modified as to produce the effect of a slight rubefacient; it is also cleanly, and does not require the sponging off and drying of the skin that mustard entails. With regard to portability and economy, it may be noted that a small bottle (about six ounces) of the essence represents 2lbs. 4oz. of mustard, and that any quantity of this may be used, while any remaining in the bottle can be kept for an indefinite period without losing its potency. Besides, the extract may be diluted to any extent with water, according as the effect produced is required to be severe or mild. Economy, portability, facility of application, cleanliness, and effectiveness, are fully secured by the employment of M. Savary's excellent Extract of Mustard.

AIR AND ITS RELATIONS TO HEALTH AND DISEASE.

BY FRED SMITH, M.R.C.V.S., ARMY VETERINARY SURGEON.

(*Continued from page* 35.)

I have spoken of this carbonic acid as parts per cent.; it is more simple to describe it as parts per 1,000, as it gives us a whole number, or a larger decimal, which is more readily remembered. We may consider our volumes per 1,000 as cubic feet, so that in every 1,000 cubic feet of air of the Ecole Militaire, 7 cubic feet of CO_2 was found. Dr. de Chaumont found 1 cubic foot and half a cubic foot; Mäcker, $8\frac{1}{2}$ cubic feet and 17 cubic feet; and Angus Smith, ·8 cubic foot.

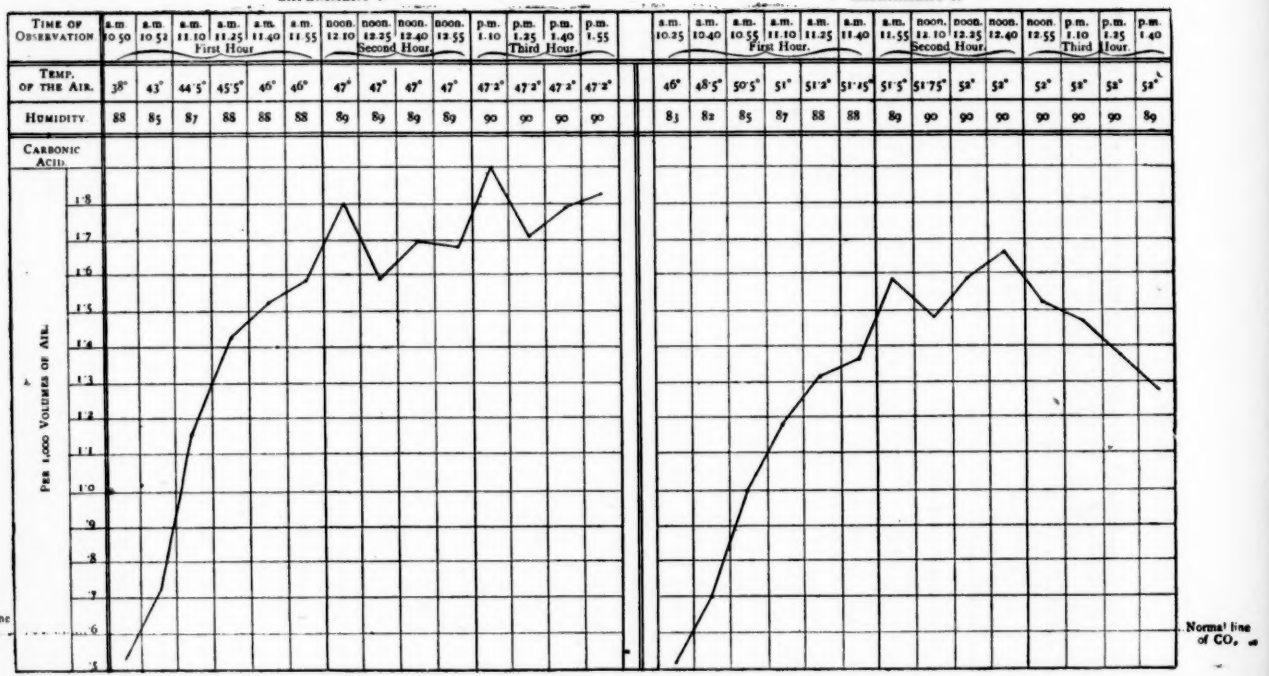
I have devoted especial attention to this subject, and have made nearly 200 analyses of the air of stables. The results obtained are not only interesting, but of real practical utility. In addition to many independent analyses, I have made three experiments for determining the amount of carbonic acid in closed stables, observations being made every quarter of an hour for three hours in two cases, and for six hours in another. It would weary the reader to give the details of these experiments, but I have endeavoured to express what occurred by means of the graphic method of a chart. In every case the CO_2 in the outside air, temperature, and moisture was determined, and the same done in the stable every fifteen minutes.

Taking the normal CO_2 in these cases at ·5 or ·6 per 1,000, we have a rapid rise in the amount of carbonic acid, which is especially remarked during the second and third quarters. This rise is kept up, though slower, until the second or third hours, when distinct fluctuations occur. The cause of these fluctuations appears to be that, after a time, the air gets so loaded with moisture that proper diffusion of the gases is retarded, and thus more is obtained at some times than at others.

In Experiment I. the CO_2 varied from ·7 to 1·8 per 1,000. The maximum was reached in the middle of the second hour, and the impurity of this building was three times more than it should have been. In Experiment II the CO_2 varied from ·7 to 1·6 per 1,000, or nearly three times larger than it should have been. In Experiment III. the observations were made regularly every fifteen minutes for six hours ; the least amount of impurity was ·9 per 1,000, the greatest 2·6 per 1,000, or nearly four times larger than normal. In this last experiment, the maximum was reached during the middle of the fourth hour ; the chart here shows a distinct rise and then a fall; this was due, I think, to the animal feeding, when, of course, a larger amount of CO_2 is given off.

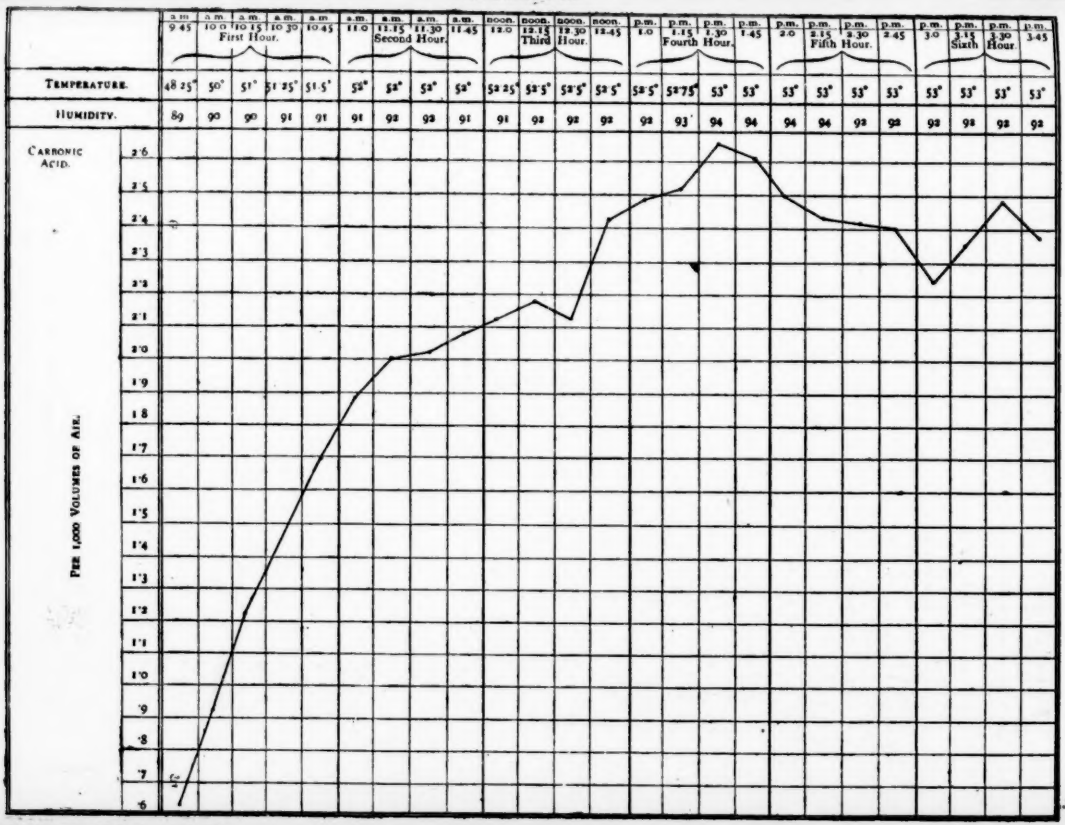
I am afraid that the apparent smallness of the number representing the carbonic acid found in stables will have the effect of causing one to think but lightly of its presence. Drs. Angus Smith and De Chaumont have both pointed out that a very small amount of carbonic acid shows deterioration of the air sufficient for the senses to observe. Strange as it may appear, yet the sense of smell can distinguish in London air differences amounting to ·04 per 1,000 ; in fact, Dr. de Chaumont employs the sense of smell for detecting respiratory impurity in rooms which is exceedingly accurate, from ·6 up to 1·3 per 1,000 of CO_2. To bring, however, more home to one the small amount of CO_2 which may be present in the air, and yet be the indicator of extreme impurity, I may say that a difference of ·2 per 1,000 in a room is unpleasant to most of us, whilst the presence of 1 part per 1,000 of CO_2 in the air of a room renders the place extremely offensive and oppressive to the sense, or, as Angus Smith expresses it, "odious and unwholesome." Now if this is the effect of 1 part of CO_2 per 1,000, one may imagine the condition of the stable in Experiment III., where I found 2·65 per 1,000 of this gas.

One more example to impress the fact that apparently minute changes in this acid are really indications of enormous increase. Let us take a stable of 10,000 cubic feet, such as would be occupied by six or seven horses ; the total amount of carbonic acid in it should be six cubic feet (or ·06 per cent.). We now analyse the air of this stable, and find the carbonic acid is equal to ·266 per cent. ; now this ·266 per cent., when placed against ·06 per cent., does not appear anything particularly striking ; but calculate it to show the amount in 10,000 feet, and we get 26·6 cubic feet, or in other words, twenty times more than it should be. This shows us how carefully we should note slight increases in the CO_2 of stables as indications of the utmost importance. In calculating out the amount present in the air, we cannot be too minute ; the calculations should always be made to the fourth place of decimals, or one in a million. On reference to the table it will be observed that we have three stables showing enormous impurity, 7 per 1,000 in the French stable, and 8½ and 17 per 1,000 respectively at Gottingen. It is quite impossible to imagine the condition of these airs to the senses ; when I obtained 2·65 per 1,000 the air was abominable. Large quantities of CO_2 are found in the air of mines ; the very worst specimen yielded 25 per 1,000 of this gas ; but in this place lights would not burn, and the men could only work a few minutes at a time, and were often dragged out senseless ; yet we find 17 per 1,000 in this Gottingen stable, and carbonic acid, which has its origin in animal impurity, which is not so in the case of mines.



EXPERIMENT III.

EXPERIMENT III.



Let us briefly recapitulate these important points. The CO_2 found in the air of stables is an indicator of the amount of organic matter which is present, numerous experiments have fixed the total amount of CO_2 which should be found at ·6 per 1,000 ; all over this indicates defective ventilation, and shows us that the animals are breathing impure air.

Ammonia is present in traces in the air of towns, but in air vitiated by respiration it may be found in large amounts. The ammonia itself is not injurious, but, as Dr. Smith expresses it, "it has very bad relations, and keeps best company ;" in other words, it is the product of organic matter, and is regarded as another index of impurity. In determining ammonia chemists divided it into two forms, "free" and "albuminoid." The free ammonia, as its name implies, represents the free, saline, or uncombined ammonia present in the air ; the albuminoid ammonia, on the other hand, represents the amount of nitrogenous organic matter present. In pure air the amount of free ammonia is ·0009 grains in 35·3 cubic feet ; and of albuminoid ·0006 grains in 35·3 cubic feet. In a bedroom, before occupation, Angus Smith found ·002 grains, and after ten hours' occupation ·004 grains in 35·3 cubic feet. In the Portsmouth General Hospital the amounts were very large, no less than ·012 grains of free and ·019 grains of albuminoid ammonia in 35·3 cubic feet. I have made a few analyses of the air of stables, etc., for the presence of ammonia. We would naturally expect to find the free ammonia very large, and such is the case. I obtained ·015 grains of the salt in 35·3 cubic feet of air of a badly-ventilated stable, and in a litter shed the amount was ·005 grains. The albuminoid ammonia in stables badly ventilated is always high ; ·014 grains, ·009 grains, and ·024 grains in 35·3 cubic feet of air were found. Over a dung-pit the amount was ·028 grains of albuminoid ammonia.

TABLE SHOWING THE AMOUNT OF AMMONIA PRESENT IN STABLE AIR.

	Free Ammonia in 35·3 cubic feet.		Albuminoid Ammonia in 35·3 cubic feet.
Pure Air.....	·0009 grains	..	·0006 grains.
Badly-ventilated Stable	·015 ,,	..	— ,,
Litter Shed	·005 ,,	..	— ,,
Air over a Dung-pit	— ,,	..	·028 ,,
Badly-ventilated Stable	·0149 ,,	..	·014 ,,
,, ,, ,, ...	— ,,	..	·024 ,,
,, ,, ,, ...	— ,,	..	·069 ,,

These quantities, like the carbonic acid, may appear very small, but I assure you that, on the other hand, they are indications of enormous impurity.

Sewer Air has a variable composition, depending upon the amount of decomposition and the extent of dilution with air. These gases are hydrogen sulphide, ammonium sulphide, nitrogen, carbon dioxide, carburetted hydrogen, and fœtid organic matter (Parkes). The organic matter is peculiar, and possesses such powers of penetration that it is stated it will pass easily through walls ; its vapour is carbo-ammoniacal, and the putrid substance a compound of ammonia. The air of sewers, by means of proper ventilation may be kept in a fairly pure state. In London sewers ·532 per cent. of CO_2, much ammonia, and traces only of hydrogen sulphide were found by Dr. Letheby. It is the organic matter in sewers, and not the gases so much, that do the harm. This organic matter has been collected and estimated by Angus Smith, who found that 8,000 cubic feet of the air of a house into which sewer-gas had found its way, destroyed more than twenty times the amount of permanganate of potash as pure air of similar amount ; he also found that sixty-two feet of air from a cesspool destroyed as much potassium permanganate as 176,000 cubic feet of air. The largest amount of

material contributed by stables to sewers is in a liquid form, consisting of urine with suspended matter from the fæces. Compounds of ammonia are the chief gases in this mixture, derived from the decomposition of urea. From the air of sewers bacteria of different forms have been obtained.

Emanations from Manure Pits are commonly believed, even by well-informed persons, to be *healthy*. The idea is a very absurd one, and probably arises from the fact that outbreaks of disease are not traceable to this cause, as others more potent and nearer to the animal are acting at the same time. Manure, when placed in the pit, undergoes decomposition; large quantities of ammoniacal gases, organic vapours, and carbonic acid are formed, but owing to the nature of the mass these substances can only escape in a partial degree, and are rapidly diluted with air as they pass out, so that the odour of the substance, though marked, is faint. But let that surface be removed, then the noxious, penetrating, poisonous products of animal and vegetable decomposition come out with full intensity.

I have made several experiments on the air of manure pits. I chose one where the manure had been standing three months (pure air that day gave ·3496 of CO_2 per 1,000 vols.) On removing a foot or so of the mass I found the carbonic acid was 3·1762 per 1,000 (nine times that in pure air). On first removing the upper crust I obtained 1·1282 per 1,000, or less than half that first found. On taking the air from the top of the pit, without touching the mass, I found ·8750, or nearly quarter less than the original amount. I next determined how far from the pit the excess of carbonic acid could be detected; I found that at thirteen yards to leeward it could not be found, at seven yards it was marked.

TABLE SHOWING THE CARBONIC ACID IN THE AIR OF A MANURE PIT.

	Carbonic Acid.
Pure Air	·3496 per 1,000 volumes
Air from the oldest part of the pit, the mass being turned up to collect it	3·1762 " " "
Air from the top of the pit, the upper surface just removed	1·1282 " " "
Air from the top of the pit, the surface being undisturbed	·8750 " " "
Air from some fresh manure recently deposited	·8517 " " "
Air taken seven yards to leeward of the pit	·4096 " " "
" " thirteen " " " " " "	·3474 " " "

We may, therefore, say that no dung pit should be nearer to a stable than thirteen yards. I next examined air collected in litter sheds, such as they use in the service to place the bedding in during the day. I found, as a rule, only a slight increase in carbonic acid, though in one case it was very large. The small amount of CO_2 in these sheds is accounted for by the care which is observed in separating all manure and soiled litter from the bedding which is to be retained.

Gaseous Impurities are conveyed to the air by the products of coal combustion, manufactories, particularly chemical works; brick-fields, copper smelting; and the result of organic decomposition, such as arises from slaughter-houses, bone and tallow works, etc. These gases are composed of carbon, sulphur, nitrogen, chlorine, etc.

Coal gas is a compound containing olefiant gas, hydrocarbons, hydrogen, marsh gas, carbonic oxide, hydrogen sulphide, nitrogen, carbonic acid, sulphur dioxide, carbon disulphide. The odour of coal gas is so penetrating that one part in ten thousand is readily recognised by smell. Recently Pettenkofer has investigated the subject of coal-gas poisoning. The burning of gas alters the composition of the atmosphere, the same as the process of respiration; it gives off carbonic acid, watery vapour, and consumes oxygen. A single gas flame raises the temperature of

a room as much as eight men ; contributes as much carbonic acid as three ; and nearly as much aqueous vapour as five ; while it consumes as much oxygen as six men. One cubic foot of gas will raise the temperature of 31,290 cubic feet of air 1° Fahr. It is necessary that the amount of vitiation of air, which the combustion of gas will bring about, should be remembered. Most of our stables are lighted by this means, and arrangements should be made in badly-ventilated buildings, by means of an outlet above the flame, to reduce the contamination as much as possible.

Sulphuric acid works give out sulphuric acid, nitrous and sulphurous acid gas, and arsenic ; copper works send out large quantities of sulphurous acid and arsenic ; alkali works give forth hydrochloric acid. From ammonia works sulphuretted hydrogen is evolved. The effect of these acid gases on vegetation is considerable, as we will refer to later on.

The Air from Marshes contains an excess of CO_2, a diminished proportion of oxygen, and compounds of hydrogen, nitrogen, and watery vapour. The organic matter contains bacteria.

Inorganic substances in the air produce no ill-effects on animals of which I am aware. The long list of diseases in man produced by their agency is entirely the result of civilization. I allude to those affections produced by the inhalation of poisonous vapours, as in match-makers, tin-plate workers, coppersmiths, painters, etc., etc., or of solid particles, as in miners, potters, knife-grinders, file cutters, &c.

Diseases produced by Impure Air.

It is only since the end of the last century that the necessity of animals being supplied with pure air has been recognised. James Clark, a veterinary surgeon, of Edinburgh, in a work published in 1788, drew forcible attention to the foul condition of the air of stables. Following close on this we had the outcry of Coleman; it was the position of influence which he occupied in the scientific world which enabled his views on ventilation to be brought prominently before the public. Fresh air in those days was considered not only unnecessary, but actually pernicious, and every attempt was made to rigidly exclude it from buildings ; every aperture, as Stewart tells us, being closed, the keyhole and threshold of the door not being forgotten. Is it any wonder that, in an atmosphere of this sort, disease reigned supreme?

There is probably no cause, or aggregate of causes, which has contributed so much to the production of disease as foul air. The introduction of a proper system of ventilation has been the means of practically eradicating diseases which carried off animals by hundreds, and has saved both the country and private owners thousands of pounds. The credit of this must be entirely given to Coleman. Apart from what has been handed down to us by tradition, we have the fact actually placed on record by Sir Astley Cooper,* in which it is stated that thousands a year were saved to Government in consequence of Mr. Coleman's annual visits to the military stables throughout Britain. Farcy, which, previously to his interference, had committed annually most extensive ravages, became nearly erased from the Government returns of disease. We are told that "a stable in which many horses had died in rapid succession, although it had undergone the usual discipline of cleaning and whitewashing, was reported to Mr. Coleman as having some undiscoverable evil, probably arising from its situation. Mr. Coleman accordingly examined it, and having ascertained that its defects arose from a mal-construction, by which all proper ventilation was prevented, recommended Government immediately to make certain alterations, by means of which this would be remedied. This recommendation at first met

* "Life of Sir Astley Cooper."

with considerable opposition on account of the expense involved in the proposed improvements. His plan, however, was afterwards adopted, and it is a curious fact, that in the first year the expenses of Government were repaid by the saving, in consequence of the entire absence of disease among the horses."

The mortality amongst the horses of the French cavalry was at one time frightful; previous to 1836 they lost 180 to 197 per 1000 per annum; the air space being increased reduced the losses in the next ten years to 68 per 1000.

The following table* shows the mortality from Glanders and Lung disease among the horses of the French cavalry, from 1847-1866, a period of nineteen years.

	1847-52. Ratio per 1000.	1853-56. Ratio per 1000.	1857-61. Ratio per 1000.	1862-66. Ratio per 1000.
Glanders	23·32	21·44	10·97	7·24
Inflammation of Lungs and Pleura ..	104·7	110·6	45·8	3·59

This table shows that in nineteen years, a reduction of 16·08 per 1,000 had occurred in cases of Glanders, and no less than 101·11 in cases of Pneumonia and Pleurisy. These wonderful results were obtained through the labours of a Commission of Veterinary Military Hygiene, which pointed out the necessity of the ventilation of stables, increased cubical capacity, and attention to sanitation, feeding, and general care. The practical outcome of these results were, that a saving of £90,000 per annum was effected in the purchase of horses. Exception may be taken to my introducing cases of Pneumonia and Pleurisy into this table, but it should be remembered that the production of these diseases from chills and exposure to inclement weather, is generally considered by the best authorities to have been carried too far, and that the impure air breathed is a much more probable cause. This view has especially gained ground since Pneumonia, at any rate of the human subject, has been proved to be an infectious disease. The table lends great strength to this theory; there is no reason to believe that the winters from 1857 to 1866 were milder than those between 1847 and 1856. The only explanation of the great difference in the mortality is the larger amount of pure air supplied and the better ventilation of the stables.

Reynal has shown that in the old crowded stables of the Alfort Veterinary School, cases of Pneumonia as well as severe wounds quickly assumed a putrid character, and nearly always terminated fatally; but when the buildings were enlarged, well ventilated, and fewer animals admitted, this mortality ceased.† The dreadful sufferings of animals crowded together in transport and cattle ships are well known. Professor Coleman, in his evidence before a Committee of the House of Commons, stated that in the Expedition to Quiberon, the horses had not long been on board the transports, when it became necessary to shut down the hatchways on account of bad weather; the consequence of this was that some of them were suffocated, and all the rest were disembarked either glandered or farcied. He further stated that in the year 1796, when there was a great encampment at Dover, the Government could not get sufficient stabling for the horses, and over-crowding in close and confined places was the result. The most healthy horses became glandered. Some animals were sent to Hythe and placed in an open shed, and not one of those became affected. Percivall's experience during the Peninsular War was identical with regard to over-

* Copied from a most interesting and valuable paper on "The Vital Statistics of Cavalry Horses," by Dr. Balfour, F.R.S., *Journal of the Statistical Society*, June, 1880.

† "Sanitary Science and Police." G. Fleming, LL.D., F.R.C.V.S.

crowding. The production of Tuberculosis amongst cattle confined in ill-ventilated sheds is well known. In the Italian War of 1859, M. Moulin, the Chief Veterinary Surgeon, kept 10,000 horses many months in barracks open to the external air in place of closed stables. Scarcely any horses were sick, and only one case of Glanders occurred.* The case of the monkeys in the Zoological Gardens is well known. A room most luxuriantly fitted up was erected for their occupation. The ventilation was, however, so defective, that of sixty healthy animals placed in this house, fifty were dead in a month from Phthisis, and the remainder were dying. On being properly ventilated the place became perfectly healthy. About thirty years ago a severe epizootic of Influenza appeared in Boston. At the instigation of Professor Bowditch, every stable in the city was inspected and classified as "excellent," "imperfect," or "wholly unfit," in respect to warmth, dryness, light, ventilation, and cleanliness. It was found in the first class fewer horses were attacked, and the disease was milder; while in the third class every horse was attacked, and more severe and fatal cases occurred. In respect to the numbers attacked, and the general characteristics of the disease, the three classes stand to one another, as 1, 3, 5.†

(To be continued.)

PROFESSOR BOULEY

IT is announced that a monument is about to be raised, by public subscription, to the memory of the late Professor Bouley, at the Alfort Veterinary School, and an appeal has been made by the Société Centrale de Médecine Vétérinaire to all veterinary surgeons, to Medical Faculties, and to the learned bodies to which the illustrious veterinarian belonged, to participate in this worthy movement. M. Bouley was an Honorary Associate of the Royal College of Veterinary Surgeons, and this—besides the great services he rendered to Veterinary Medicine, gives the appeal a strong claim to the attention of our colleagues in this country. The subscription list closes in March, and subscriptions are received by Messrs. Asselin and Houzeau, Librarians, Place de l'Ecole de Médecine, Paris. We feel certain many of the veterinary surgeons in this kingdom would like to testify to the esteem in which they hold the memory of this great man.

Proceedings of Veterinary Medical Societies, &c.

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION.

THE usual quarterly meeting of this association was held at the County Hotel, Newcastle-on-Tyne, on November 27th, 1885; the President, G. Elphick, Esq., in the chair. There were present ten members and three visitors. The following gentlemen were elected office-bearers for the ensuing year: President—Mr. J. B. Nesbit, Fence Houses; Vice-Presidents—Messrs. A. Chivas (Corbridge), and Mr. Hedley, Darlington; Secretary and Treasurer—Mr. Gresty, re-elected; Auditors—Messrs. C. Stephenson and A. Hunter, Newcastle-on-Tyne, re-elected.

The PRESIDENT then called upon Mr. GRESTY to read his paper as follows:—

* "Practical Hygiene." E. Parkes, M.D., F.R.S.
† "Hygiene and Public Health." A. Buck, M.D.

Obstructed Bowels.

Mr. President and Gentlemen,—The subject I have selected to bring forward for discussion this afternoon—viz., "Obstructed Bowels"—is one which I feel sure will meet with your approval; not that I have anything original to call your attention to, but from the fact that cases of this oft-times troublesome complaint are of daily occurrence in our different practices, and any fresh hints that we may gather when relating our various experiences will, I feel sure, be most acceptable to us all. It is not my intention, gentlemen, to go deeply into the subject, but merely to give you as much useful, practical matter as I can with the limited time at my disposal; and, in order to simplify my paper as much as possible, I propose to take the following headings, and treat them in rotation:—

1.—Definition.
2.—Causes which are liable to produce the disease.
3.—Symptoms: their modifications and stages.
4.—Treatment.

1.—*Definition.*

To define Intestinal Obstruction is rather an awkward matter, owing to the difficulty in drawing a line between this and other intestinal diseases. The only definition I can give you, which is at all satisfactory, is as follows: Obstructed bowels comprise all those cases in which the contents of the intestinal canal are obstructed in their onward passage by causes or conditions occurring within the abdomen or pelvis.

2.—*Causes.*

The causes of Intestinal Obstruction are numerous and varied, comprising as they do those from accidents and from natural causes. Obstruction from the accidental admission of foreign bodies into the alimentary canal are much more common in dogs than in other animals, owing probably to the peculiar nature of their food and their depraved appetite; and it is most interesting to look up old records and note the strange things that have been swallowed by dogs, and have been the means of causing obstruction—pieces of wood, corks, rope, bones, needles, etc., in fact, almost anything that is portable and possible to swallow; other frequent causes in our canine patients are worms and pieces of indigestible hide, the latter of which dogs have a peculiar liking for. In our equine patients the causes are very varied, and in a great majority of cases difficult to find out; often no special cause can be detected at all, even under the most minute inspection of the animals surroundings, food, etc.; and cases frequently occur where the seat of the obstruction and its cause the veterinarian attending is entirely ignorant of. Probably, the most common cause is indigestion, due to over-feeding on improper diet, such as coarse, rough hay or straw containing too much woody fibre. The most frequent seat of obstruction from this cause is in the colon, and the practitioner is often enabled, by exploration per rectum, to satisfy himself of the exact seat of the obstruction and also, to some extent, of its severity. Another common cause is from calculi, which are generally found in the large intestines, and in some instances attain enormous sizes. In addition to the two causes already mentioned, we get Intestinal Obstruction from intussusception, Volvulus, compression, constriction, stercoral concretions, and Paralysis. Several of the last-named are only rarely met with, particularly intussusception, compression, constriction, and stercoral concretions; Volvulus, again, is a common factor in producing obstruction, and, unfortunately, so far as our veterinary patients go, a very effective and fatal one.

Paralysis, as a rule, is not an immediate cause, but is generally preceded by some other cause or disease, such as Enteritis.

It is very seldom indeed that obstructed bowels are, in horses, caused by the accidental admission of foreign bodies into the canal; but that this is quite possible, although I venture to say very rare, is evidenced by the following unique case, the history of which appeared in one of the daily issues of the *Manchester Courier* in the year 1866, under the heading of "An Extraordinary Cause of Obstruction in a Horse's Bowels: Importance of Examination per Rectum.—By Thomas Greaves, M.R.C.V.S. A few days ago a valuable lorrie-horse, the property of Messrs. Carver and Co., of this city, exhibited abdominal pains as he was returning from his work. For nearly three days his sufferings were excruciating, and without one moment's intermission. All remedial measures were unavailing, and it was apparent that he must inevitably have sunk in a few hours unless relieved.

"At this juncture, as Mr. Greaves was carefully exploring the bowels, at the stretch of his arm, the tips of his fingers came in contact with a strange substance. On tearing away a small portion, it was found to consist of a fibrous material, and the substance was so firmly impacted in the bowel that it took him twenty minutes of gentle, persistent effort before he succeeded in grasping this foreign body; it required both hands to bring it within sight, and then, with the aid of the head horsekeeper, it was successfully extracted. It consisted of a considerable strip of coarse nail bagging, partly masticated, and densely impacted in feculent matter. It was fourteen inches in length, twelve inches in circumference, and weighed two and a half pounds. The grateful feelings expressed in the face of the suffering animal were apparent to all around him, and indicated the great relief he experienced. Although the pains subsided from that moment, the constitutional disturbance was so serious as to require the greatest possible after-care. For fourteen days he was in a most critical state; for six days he ate next to nothing, and his pulse marked over 100 beats in a minute, and during the next six days ranged about 80. He is now entirely recovered. Taken as a whole, this case stands without parallel."

Indirectly, small foreign bodies do occasionally act as obstructionists, but only, as a rule, when they form the nucleus for a calcerous deposit, which finally may attain sufficient size to obstruct the canal.

In cattle, what is commonly known as obstructed bowels is, in nineteen cases out of twenty, impaction of some part of their capacious stomachs, which, owing to their large size and complicated arrangement, give the food a much better preparation than the smaller ones of horses, dogs, and pigs; thus, instead of the intestines in these animals having, to a great extent, to prepare the food for assimilation, the food, after it passes out of the fourth stomach in ruminants, is in such a condition that there is little tendency to cause obstruction.

Cases of purely obstructed bowels in cattle do occasionally make their appearance, especially in some counties where the castration of bulls is very common, under the title of "Gut-tie." These peculiar cases which, I believe, are not uncommon in the south, may be classed under the head of causes from constriction, being due to a peculiar strangulation of the intestine by the spermatic cord and peritoneum.

Other isolated cases of stricture of the small intestines in cattle have been chronicled in our different journals, and in the majority of these cases the writers have agreed that the original cause was probably some slight twist, which, having relieved itself again, has been succeeded by some slight inflammation, causing gradual thickening of the coats of the canal, and consequent diminution in its calibre.

3.—*Symptoms, their Various Modifications and Stages.*

The symptoms of this disease vary a good deal in our different patients;

in our canine friends they consist principally in an anxious expression quickened pulse, continuous uneasiness, vomiting, and ineffectual efforts to defecate.

In horses the symptoms and their various stages are very interesting. If only a slight attack, nothing particular will be seen except that probably the patient has had a very mild attack of colicky pain, and that no fæces have been passed for some considerable time. In severe cases the symptoms are much more severe and prolonged, and vary, to some extent, according to the position of the obstruction.

The general symptoms noticeable at the commencement of severe cases are, colicky pains continuous and prolonged, quickened pulse, blowing, sweating, anxious expression, mucous membranes dirty and injected; straining, and in some cases, in the first stages, purging; mouth pasty, fetid, and with a peculiar, gunpowdery smell; more or less hardness and distension of the abdomen, and in many cases total absence of intestinal murmurs.

These symptoms, if not successfully combated, become gradually aggravated, the anxious expression gets more pronounced, the pulse feebler and sometimes almost imperceptible, the colicky pains increase, the blowing becomes more laboured, the mucous membranes more injected, cold sweats bedew the body, and the patient becomes gradually exhausted from pain and exertion. If these latter symptoms appear in an animal where energetic treatment has been of no avail, a fatal termination may be looked for.

In the first stages quantities of fæces may be passed—in fact, this is often the case, and may lead the practitioner somewhat astray without he is careful and observant. In cases where Volvulus is the cause of obstruction, the symptoms are very severe and continuous, and, in addition to those already mentioned, the patient will often evince a desire to roll over on his back or sit on his haunches, and will remain in that position for some considerable time.

In some cases of Volvulus the twisted gut can be plainly felt per rectum, and it is not impossible, if the twist is quite recent and within easy reach of the hand, that careful manipulation may be of some benefit. Again, I have frequently noticed, in cases where the obstruction has been due to impaction of the colon, that the animal so affected would make no attempt to lie down, but would stand continuously, occasionally looking round at his flank, crouching down, twisting his tail, and probably, if in a box, rubbing his rump up against the wall.

When calculi are the offending bodies you may get any of the symptoms mentioned, and without the calculus is within reach of the hand per rectum, it is almost impossible to diagnose correctly. The best guide we have for detecting these foreign bodies is undoubtedly the previous history of the patients; this is not at all times easy to obtain, but it frequently happens, where the practitioner has attended the same stud of horses for years, that there is probably some old offender not likely to be forgotten, on account of the innumerable times he has been pulled out of bed to treat him for Colic, and where calculi are suspected; these cases are very diagnostic, and the veterinarian is quite prepared to see his old friend get a worse attack than usual, and die from obstructed bowels, *post-mortem* examination revealing, in a majority of cases, calculi.

Of the symptoms seen in cattle I can say but little, not having, to my knowledge, had a case under my supervision. In Gut-tie I believe the recognised ones that are considered diagnostic are, crossing of the hind-legs, backing, abdominal pain, no passage of fæces but discharge of bloody-covered mucus. In other cases of obstruction not caused by this peculiar lesion, I do not think there are any really diagnostic symptoms that would enable the practitioner to state definitely if the obstruction was situated in the stomach or bowels.

4.—*Treatment.*

Owing to the diversity of opinions that exist as to the treatment of this disease, and the great number of remedies that have been tried with varying success, it would be impossible, in a short paper like this, to treat the subject as it deserves ; I shall therefore merely give you an outline of the treatment which I have found most successful.

In simple cases of obstruction in horses, most probably arising from indigestion, and where there is not much pain, a dose of physic or draught of linseed oil, an ordinary dose of colic medicine, and a few enemas is often all that is necessary to effect a cure. Other remedies which I have given in these slight attacks, and which have in the majority of cases proved successful, are carbolic acid, given in two-drachm doses (along with linseed oil), and Professor Dieckerhoff's new remedy, physostigmia, given hypodermically. This latter remedy, I think, will become extensively used by veterinarians ; I have only lately given it a trial, and so far the results have been favourable, but only in cases where pain has been slight ; it undoubtedly has a most powerful effect on the bowels, and in about thirty minutes after administration, in nearly all the cases I have tried it on, it has caused straining and increased peristalsis, accompanied in one or two instances with passages of fæces.

In severe and lingering cases, the great things to be looked after are to relieve the pain as much as possible and prevent exhaustion. Many of these cases are most obstinate, and require a great amount of patience on the part of the practitioner ; in fact, I often think that over-anxiety for the welfare of our patients is often the cause of many deaths. A good dose of physic or oil, as circumstances may direct, sedatives given in large doses, but not repeated too often (and of all draughts for these particular cases I prefer equal quantities of opium and belladonna tinctures given in a little water, or their active principles given hypodermically), hot-water fomentations to the abdomen, emptying the bladder if necessary, backraking and enemas—these remedies, in addition to carefully attending to the general comfort of the patient, are about the sum and substance of what the veterinary surgeon is capable of. In cases where the obstruction is due to impaction of the colon, and where the mass can be plainly felt per rectum, I have seen great benefit ensue from kneading the bowel carefully with the closed hand ; of course this treatment is only applicable in special cases, and even then is often disheartening.

Hot-water fomentations I greatly esteem, and where you have a patient in an exhausted condition from pain and exertion, I know of no remedies so effective. Unfortunately, the one great drawback to this line of treatment is the almost impossibility in many places of getting the necessary appliances (a plentiful supply of hot water, rugs, etc.) for its proper application, and unless the practitioner has these means at command the treatment is best left alone.

Counter-irritation, applied to the abdomen in the shape of irritating remedies, I do not agree with, as they, as a rule, only add to the animal's suffering without producing any good results.

If counter-irritation is to be adopted, I think nothing is so useful as friction applied by the aid of a good straw wisp ; this I have often seen give relief, and it is undoubtedly a valuable addition to our stock of remedies for this and many other diseases.

The after-treatment is usually simple, and may be summed up in a few words—good nursing, gentle exercise, a little stimulating and tonic medicine, and a moderate supply of easily digestible food being in most cases all that is necessary.

The treatment of our canine patients for this disease, when arising from

natural causes, is simple and effective, consisting principally of a good purgative and a few enemas. If the obstruction is from a foreign body, there is little chance of effecting a recovery without the offending substance is within reach per rectum.

In cattle, owing to the great difficulty of correctly diagnosing if the lesion is in the stomach or bowels, the treatment must necessarily be very similar to that pursued in ordinary cases of impaction, consisting of a large dose of sulphate of magnesia or other strong purgative, turpentine or hyposulphite of soda if much tympany, plenty of fluids to drink, sedatives if much pain, and attention to the animal's comfort and dieting. In cases of "Gut-tie" I believe the usual recognised line of treatment is to make an incision into the abdomen from the right side, and release the bowel by breaking down the cord with the hand. Not having had the pleasure of seeing the operation performed, I can give you no details concerning it.

A very interesting discussion followed, in which all present took part, the meeting terminating with a hearty vote of thanks to the retiring President and essayist. COLIN GRESTY, *Hon. Sec. and Treasurer.*

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

THE usual quarterly meeting of this Society was held in the London Hotel, Edinburgh, on November 25th, Professor Williams in the chair.

The minutes of the previous meeting were read and confirmed. The following office-bearers were elected for the ensuing year: President—Professor Williams; Vice-Presidents—Messrs. Burnett, Fairbairn, and Lewis; Secretary and Treasurer—Professor W. O. Williams; Auditors—Professor Walley and Mr. Rutherford.

Professor WALLEY then read an interesting paper on "Venereal Disease in the Lower Animals," "The Abortive Treatment of Actinomycosis," and "A New Intestinal Parasite in the Swan"

VENEREAL DISEASE IN THE LOWER ANIMALS.

Mr. President and Gentlemen,—In bringing before your notice the subject of "Venereal Disease in the Lower Animals," I may state at once that I have several objects in view. *The first of these is to inquire as to what extent our domestic animals are liable to such affections. The second is as to whether we are justified, in the present state of our knowledge, in assuming that they suffer from conditions allied to those which are characteristic of Syphilis in man. The third is to direct attention to a method of treating intractable venereal sores in the dog which is both sure and effectual.*

In reference to the first of these questions I may remind you that veterinary practitioners in this country are well acquainted with the fact that several of our domestic animals are sometimes affected with the disease known as *Gonorrhœa*, or, as it is termed in cows, "bull-burnt."

This specific form of urethritis, for such it is, occasionally makes its appearance in herds under such circumstances as to warrant the expression of an assumption that it is in such cases generated autogenetically.

I have myself seen it appear in herds in which neither the male nor the female members had ever been allowed to come in contact with other animals for procreative purposes, and I am well aware that other practitioners have seen it arise under identical conditions. In the matter of the dog I have frequently had cases brought to me in which the owners of the animals have declared that they (the dogs) had *never been in contact with any female for copulative or other purposes.* When once the disease arises in the male its spread is not difficult to explain, and I have notes of some

cases in a number of mares which came under the observation of one of my late pupils, Mr. Barclay, of Dunfermline, and which were all traceable to infection from one stallion, who, it was subsequently shown, was the subject of the malady.

In France there exists a well-known form of venereal disease, known as "La Maladie du Coit." Happily—at least, so far as I know—the equine species in this country is exempted therefrom. Neither have I ever seen any such form of disease in the sheep or in the pig.

As to how far Gonorrhœa may be looked upon as a specific disease, I may first direct your attention to the fact that the literal meaning of the word used to designate this class of affection is totally out of accord with its usual application. It signifies an excessive flow of semen—a condition sometimes observed in young vigorous dogs when excited by the near proximity of œstral bitches, and which, owing to the fact that it is accompanied by tumefaction of the sheath and swelling of the testes, is confounded with the affection usually termed Gonorrhœa. The use of the term is, however, warranted by custom, and I do not feel disposed to cavil at its application to the form of disease under consideration.

As to the specificity of Gonorrhœa, I may remind you that the researches of those engaged in inquiries as to the nature of the disease in the human subject have not resulted in any definite issue. True, the statement has been made that a micrococcus has been detected in the discharges of gonorrheal urethritis, and in those of gonorrheal ophthalmia, identical in its characters from both sources ; but there are those who assert that in urine which has undergone fermentative changes a micrococcus, recognized as *M. urinæ*, is always present ; further, inquirers—MM. Lepine and G. Roux—have recently drawn attention to the fact that when cultivations of this now well-known micrococcus are introduced into the urethral canal of male animals, and retained there for a short time, a specific urethritis is established, which extends to the bladder and kidneys, and produces death, with reproduction in large numbers of the micrococcus in the urinary products ; and of still greater importance is the further statement that healthy females confined in cages with these experimentally-infected animals become the subjects of identical conditions, and die with similar urethral, cystic, and renal lesions well developed.

Now, if these altered micrococci were the actual cause of Gonorrhœa, we should expect that in old-standing cases the bladder and kidneys would become diseased ; such, however, is never observed—at least, in my experience. That specific urethritis in animals is identical with that of man is proved by the fact that in dogs we not infrequently see well-marked gonorrheal conjunctivitis produced by contact of the urethral discharge with the conjunctiva. The infection is conveyed by the animal licking its penis, and subsequently by one of the hind feet, from which the virus is passed to the conjunctiva in the act of scratching. Mr. Alex. Grey informs me that some years ago he saw a monkey—which had contracted the disease from handling contaminated lint thrown away by a sailor on board ship—with gonorrheal conjunctivitis, the infection having been conveyed to the membrane by the creature's own hand.

So far, then, we see that Gonorrhœa affects the horse, the ox, the dog, and the monkey ; that in these animals its course is similar to that which it follows in man. But what about our second query : "Do the domestic animals suffer from Syphilis?"

The great characteristics of Syphilis are—firstly, that it is a disease causing a chronic course ; secondly, that its most prominent lesions are indolent ulceration of mucous membranes and skin, with chronic enlargement and induration of lymphatic glands, with ulceration of the skin covering these glands.

Do we meet with such lesions in veterinary practice? Most certainly, yes —in the dog at least. Are they of a syphilitic nature and origin? I will answer this question by expressing the opinion that they are of that nature, and I think I am warranted in so doing by the characters presented by these lesions and by their course.

I am quite aware that objection may be taken to my conclusions on the ground that the chronic lesions seen in animals are only results—or *secondary symptoms*, if you like—of Gonorrhœa. So used pathologists to consider the lesions of Syphilis in man; but they have now come to look upon them as being totally different both in nature and in cause.

I know it has been said that the *chancre* of the dog differs materially from that seen in man, in the fact that its edges and base are less indurated. Granted this to be the case, may not, I ask, any slight difference in character be due to differences in structure (histologically) in the membranes in the two animals?

A chancre makes its appearances on the penis of the dog; it gradually extends its bounds; other chancres form, and in some instances the primary and secondary sores coalesce; from the surface of these sores a puriform fluid, ichorous and infective in its character, is discharged; this fluid sets up a degenerative inflammation in the skin of the thighs, the abdomen, the chin, and in fact in all parts with which it comes in contact. These sores do not yield to the local application of caustics, and in many cases are affected only to a limited extent by the internal administration of potassic iodide and mercury, unless, indeed, these drugs are pushed to a dangerous extent.

In the course of time the dog begins to arch his back, and the motion of the hind legs becomes stiff and the gait straddling. By these signs the attention of the practitioner is directed to the inside of the thigh, and he there detects a *bubo* identical in its characters with that seen in man, and, like it, ultimately associated with chronic ulceration of the skin covering it. If these lesions are not syphilitic, what are they? I leave those who deny that the disease exists in the lower animals to answer the question.

In reference to the treatment of those important lesions, *bubo* and *chancre*, I may observe that the former is much more easily dealt with than the latter. In my experience the free inunction of iodine ointment, with the application of nitrate of silver to ulcerated surfaces when such are present, quickly produces resolution, but in obstinate cases I should advise iodine irrigation or extirpation of the tumour; no harm could result from the adoption of the latter course, and seeing that there is great danger of the gland becoming a centre of infection to the system it would be the wisest course to adopt.

In the treatment of chancrous ulceration of the penis we have an infallible remedy, if I be permitted to so designate it, in castration. I am perfectly well aware that some of my scientific friends will utter an exclamation of surprise and horror when this statement meets their eyes, but one fact is worth a dozen theories, and however unscientific and unsurgical the operation may at first sight appear, it is all the same an absolutely effectual cure. In the case of valuable stud dogs the removal of the testicles would, I need scarcely say, be a matter of grave importance, as its adoption would mean annihilation of the procreative function; but in dealing with animals in which their use for stud purposes is only of secondary importance, the operation should unhesitatingly be performed if other remedies fail in effecting a cure. The first occasion on which I adopted the treatment in practice was in October, 1873, at which time I had under my care a nondescript-bred terrier (much prized as a companion by his owner), suffering from venereal sores on his penis and on the skin of the abdomen and thighs. After giving the usual constitutional remedies, as potassic iodide and mercury, and the usual local

applications as nitrate of silver and sulphate of copper, a lengthened trial, I determined upon trying the effects of castration. My reason for performing the operation was that I observed whenever I manipulated the animal chordee became very marked, and this was followed by extreme vascularity of the penis and particularly of the tissues involved in the ulcerative process. In my own mind I came to the conclusion that if priapism was prevented by castration this periodical hyperæmia would be done away with and *rest* insured to the cells of the diseased parts.

The operation was performed, the effects of it surpassed my most sanguine expectations, and the dog was quickly discharged cured.

In the early part of the present year I was asked to examine a retriever dog in whom an obstinate eruption was presented on the skin covering the chin and around the eyes. I was informed that the animal had been under the care of another practitioner for some time, but that the treatment adopted had been unsuccessful. As my attention was only directed to this eruption, I did not think of looking further for the probable cause, though I was particularly struck by the peculiar character of the sores, and unhesitatingly gave the opinion that they were of a specific nature. By the application of naphthol ointment, an agent, I may observe, of great value in some forms of skin disease, and the administration of mercury, the sores rapidly improved, and in fact were nearly healed, but several weeks subsequently the owner of the dog, noticing an eruption in the skin of the abdomen, again brought the dog to me for examination. One glance at this eruption satisfied me as to its source, and explained the origin of the sores around the eyes and on the chin ; and, on extruding the penis, my suspicions were confirmed, the organ presenting on its external surface several well-marked venereal sores. These sores were treated, ultimately, with all the known topical remedies, not even excluding iodoform ; and simultaneously constitutional treatment was employed, but all to no purpose, and in the end the penis presented a most loathsome and horrible appearance. With the consent of the owner castration was performed. The good effects of the operation were as satisfactory as in the first case.

I may remark that I have been informed, within the last few days, by one of my pupils, Mr. Carruthers, of Wigton, Cumberland, that during the past summer an equally successful result was obtained by the adoption of this method of treatment in the case of a colley which had been the subject of venereal sores for a considerable period.

I have often felt that this treatment, heroic though it be, might be had recourse to with benefit in the human subject. I know that sentiment would oppose itself to the suggestion, but I would ask is it not better that a man who has been unfortunate enough to contract this loathsome disease should be deprived of the means of infecting others, and be himself restored to at least a moderate degree of capacity for enjoyment of the pleasures of life than that he should be allowed to drag out a miserable existence and remain a probable means of disseminating his infirmity ?

The Abortive Treatment of Actinomycosis.

In recent issues of our professional journals, I observe that Mr. J. B. Gresswell has drawn attention to the treatment of Actinomycosis by the application of phenol and iodine (iodized phenol).

I may be pardoned if I suggest that he directs attention to this combination of disinfectants in such a manner as to lead to the supposition that it is new to the veterinary profession.

In a paper read by me about two years ago at Belfast, I directed attention to the great value of a combination of iodine and phenol as a local application in infective forms of inflammation such as the inoculative lesions in

Pleuro-pneumonia and in gargarisma, and it was from observing the beneficial effects following its use under these circumstances, that I was led to advise its employment (to my pupils and to practitioners) in the abortive treatment of Actinomycosis—a disease, I need scarcely remark, essentially local in its origin, and capable of being arrested in it progress by purely local means. Amongst those to whom I recommended its use was Mr. L. Leach, who, at the meeting of the Lincolnshire Veterinary Medical Association, held at Grantham in the early part of the year, informed me that he had successfully carried out this method of treatment.

During the past summer, while on a visit at the house of my old preceptor, Mr. Kettle, of Market Drayton, I advised his assistant, Mr. Rickell, to carry out the treatment in a well-marked case in a cow. Mr. Rickell advises me that the treatment was quite successful.

The *modus operandi* of the treatment by means of which the disease is arrested is, I think, simple ; both iodine and phenol are powerful fungicides and active irritants—as the former, they destroy the fungus to which the disease owes its origin ; as the latter, they induce a plastic and consequently a localising or circumscribing inflammation, which has the effect of arresting the extension of the fungus and the lesions to which it gives rise. The surgical operations recommended merely facilitate the application of the potential agents to which I have alluded.

In order to ensure the proper application of remedies, I have had made, by Messrs. Krohne and Sesemann, the following instruments :—

(1) A *tongue scraper*, with which is combined (2) a *scarifier*—regulated as to depth by moveable screws ; (3) an *irrigator*, in the form of a pipette ; and (4) a *pair of tongue forceps*, by the aid of which the tongue can be effectually secured (a difficult matter in cattle) and its further manipulation rendered easy. The *scarifier*, I may observe, can be utilised for other purposes than the one for which it was designed, *e.g.*, for scarifying any œdematous swellings or the gums in Lampas ; while the *irrigator* may be used for similar purposes in the treatment of tumours, or for exploratory aspirations.

Intestinal Parasite of Swan.

During the summer I was asked to make a *post-mortem* examination of the body of a swan with the object of discovering the cause of its death, which had been sudden.

On laying open the small intestines I observed a number of yellowish-coloured bodies intimately attached to the mucous membrane, and having the appearance of little masses of yellow paint, but on the application of force I discovered that they were of an organic nature and attached by a pedicle to the membrane. One of my pupils, Mr. N. J. Dayle, who was standing near, suggested that they were parasites, and in removal from the intestine their true nature was readily discovered, and it was further confirmed on microscopical examination by Mr. Grey. From the characters presented, I came to the conclusion that the entozoon was a distome, but through the kindness of Dr. Aitken, I was enabled to submit some of the specimens to Dr. W. E. Hoyle for identification, and by that gentleman they were recognised as a species of *Echinorhynchus*, probably the *E. polymorphus*. Dr. Hoyle further informs me that they are found in the intestine of the duck and other water-birds, and that in their larval stage they inhabit small freshwater crustacea. They cling, he says, to the mucous membrane by the aid of a number of re-curved hooks or teeth situated on the proboscis.

In our domestic animals we are only, so far as I know, acquainted with one other species of the Acanthocephala or thorn-headed worms (to which this specimen belongs), and that is the *E. gigas* of the pig.

Whether in the swan these entozoa are the cause of much mischief or not,

may, we think, be left an open question, as, although they adhere firmly to the mucous membrane, they do not appear to induce any marked inflammatory action, nor did I observe any tendency to perforation of the bowel in the manner so often seen in the case of the analogous worm in the intestines of the pig. I also introduce to your notice specimens of a strongylus found by Mr. Percival Snaith (one of my pupils) in the stomach of a rabbit. The nematode has been recognised by Dr. Hoyle as the *S. strigosus*, of Dugardin.

Mr. RUTHERFORD made some observations on an interesting case of calculus, and exhibited the distal end of a rib with its cartilage which had been torn out of a horse's side in an accident. The case made a rapid recovery, the wound healing by first intention.

Mr. CAMERON made some remarks on "Bowel cases," and described a case of obstinate epistaxis in the horse.

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BORDER COUNTIES VETERINARY MEDICAL SOCIETY.

(*Continued from page* 45.)

We now pass on to question number two—

If the veterinary surgeon is liable, how can he best protect himself?

Various forms of wording certificates have from time to time been suggested, as tending to relieve liability, such as "I do not detect;" "In my opinion," etc., etc.

Mr. Lambert says it is said to be impossible to evade the law by the wording of certificates, and if such be the case, might not some form of printed agreement be kept by veterinary surgeons, to be signed by the person employing them before the examination of the horse, setting forth that the opinion as to soundness is only given for what it is intrinsically worth, and that the veterinary surgeon will not be held answerable for mistakes, and that he has only undertaken the examination on these terms? Unless veterinary surgeons are protected by some means or other, may not unscrupulous persons lay traps for them, if they find that lucrative damages can be obtained by a successful action? Such actions could be ruinously used to serve private malice and purposes of extortion, and young practitioners, with not much money for law charges, might be crushed by them. Sooner or later, if these actions at law are successful, medical men and veterinary surgeons will be obliged to find out means to protect themselves.

Mr. Greaves, Manchester, strongly recommends the following form of certificate, especially in high-priced animals, or where we apprehend advantage may be taken of us:—

"I hereby certify that I have this day, at the request of Mr. ———, of this city, examined a bay gelding in respect to soundness, and that I consider such horse — years old, and sound. This certificate is given after careful examination, to the best of my judgment and belief, but subject to my not being held pecuniarily liable for the opinion expressed in such certificate.

(Signed) THOMAS GREAVES."

If, he adds, the want of skill or due care is palpable, neither this or any other form of certificate can protect us ; but if we have exercised proper care and skill, this certificate is a notice to the party of the terms on which the certificate is given, and will remove all responsibility, and be a perfect protection.

This is another form of certificate which I understand is used in the South :—

"CERTIFICATE OF EXAMINATION.

"VETERINARY ESTABLISHMENT.

.....188...

"At the request of.....

I have this day examined.....

"Signed....., M.R.C.V.S.

"This certificate is given after careful examination, but I do not hold myself pecuniarily responsible in any way."

There is still another means of protection, and that is to join the National Veterinary Defence Association ; this is not only a means of protection, but also of defence.

Thirdly.—Is the usual fee of 10s. 6d., for examination, a fair and reasonable remuneration for risk, responsibility, and service rendered ?

Mr. Lambert, in further commenting on Mr. Fleming's paper, says—If the veterinary surgeon is liable for his mistakes, whether wilful or not, I say you will have to revise your fees. If you are examining a horse worth 300 guineas for half a guinea, you are laying 600 to 1 that you are right. I venture to say that no prudent man, if held legally responsible, will long be able to lay such absurdly disproportionate odds, for we all know that the most careful and experienced veterinary surgeons cannot sometimes avoid mistakes in the examination for soundness.

Mr. Moore, London, says he considers the fees for examination as to soundness very inadequate, and is of opinion that the fees should be regulated in proportion to the liability, and on some percentage scale, as in many other professions ; for instance, if you take the opinion of an architect regarding a house of the value of £100, you would be charged £5.

Now, gentlemen, I have brought before you the main facts bearing upon our responsibility in examinations as to soundness, and have, as far as possible, avoided commenting thereon, or advancing any opinion on the points introduced. You will observe that argument could be adduced for or against any one or the whole, and it is now for the meeting to decide, if possible, what responsibility we do incur. I venture to think, gentlemen, it is a subject which will bear all the earnest thought and careful consideration that you can bestow upon it.

I will ask you to discuss the questions *seriatim*, as the two last will very much depend upon the decision on the first, and I hope every member will freely and honestly give his opinion.

I will conclude in the words of Mr. Greaves, that the discussion on this subject will do our profession a great service if we only arrive at a clear and logical conclusion—a conclusion which will not only commend itself to our senses, but which will, at the same time, be legally sound, and a safe protection.

Mr. BELL, in his remarks, contended that if a man exercised ordinary care and reasonable diligence in the examination, but made a mistake, he ought not to be held liable in damages ; and suppose a veterinary surgeon, in giving his certificate, condemned an animal as being unsound when it was not, was he to be held responsible by the vendor for having damaged his horse ?

Certainly not; he simply gave his opinion. We should simply have to be careful, to use the greatest amount of care in the examination, and do our duty to our clients in the very best possible way. If we should happen to overlook some disease, we were not to be held liable. This sometimes happened upon a hasty examination. As to the age, I think that veterinary surgeons should certainly be able to state the age, and not certify that an animal is younger than it really is, thereby making it more valuable in the eyes of the purchaser. As to getting the law officers of the Crown to introduce some protection for us, he thought we would not be favoured any more than other professions.

Mr. TALLENTIRE did not think they could alter their position at all.

Mr. HARRISON: Common sense told us we would be responsible if we made very gross mistakes. Our actions resembled those of the railway companies: it would depend upon evidence. If we exercise thorough care, and we examined the animals thoroughly, and could produce evidence to that effect in any action brought against us, we would have a very good chance of succeeding.

Mr. CARLISLE thought no form of certificate would shelter us. Some safeguard should be allowed the public to protect themselves from dishonest veterinary surgeons, who were still common enough.

Mr. BELL produced a copy of a certificate which had been given by a veterinary surgeon, and characterised it as a disgrace to them. It was such ignorance as was shown there which brought the profession into disrepute. He also referred to two cases in which a veterinary surgeon had certified two horses to be sound when they were not.

Mr. CARLISLE thought the person who made out the certificate produced was not qualified.

The CHAIRMAN remarked on the unfairness to purchasers of horses older than they were stated to be in the certificate.

Mr. CARLISLE: We have nothing to do with the value of the horse we examine.

Mr. THOMPSON suggested that the charge for examination might be based on a sliding scale.

Mr. CARLISLE said veterinary surgeons, when examining a horse, were very often asked the value, a very improper question. We sometimes place ourselves in very unpleasant positions by answering it. He contended that veterinary surgeons should be liable for want of care or skill. Certificates had done more harm to the profession than anything else, he thought. In actions for damages it was remarkable that so many eminent men should be of different opinions.

The CHAIRMAN: People have got it into their heads that they can get veterinary surgeons to say anything.

Mr. THOMPSON commented on the bribery in the profession, which, he said, was still very common.

Mr. BELL also spoke of the corruption in the profession.

Mr. DONALD was surprised to hear of the extensive corruption, and hoped the rising generation were an improvement in that respect. The gentlemen engaged in the actions quoted in his paper were, he thought, above suspicion, though men of the highest eminence were ranged on opposite sides, giving different opinions on the same facts; and who would say that these men were not giving their honest opinion?

Mr. HARRISON thought that if a man overlooked a spavin or a splint he ought to be sued. He thought himself that unless negligence was proved, that the veterinary surgeon had not carefully examined the horse, he could not be injured otherwise than by being run into great expense by an action being instituted against him; but we ought to have some exact knowledge of the extent of our liability. In the dentition case referred to, Professor Williams supported the man against whom damages were given.

Mr. BELL : The National Association came forward in that case "to help a lame dog over the stile." They stretched a point.

Mr. CARLISLE recommended them to take plenty of time in examination ; and with ordinary skill, and giving a certificate according to their opinion, then he did not see how a man could be interfered with.

Mr. DONALD : Who is entitled to decide what is negligence and want of skill, when in every case which comes before the Courts men equally eminent are on different sides ?

The CHAIRMAN, in summarising the discussion, said it appeared to be the general opinion that unless they showed negligence or ignorance they were not to be held liable.

With regard to the second question raised by Mr. Donald's paper—"Is the fee charged for examination sufficient ?"—

Mr. CARLISLE thought it was.

Mr. HARRISON agreed.

Mr. CARLISLE : Some well-known men get a guinea, which was sometimes little enough.

The CHAIRMAN thought 10s. 6d. not enough. He always got £1 1s. 0d. In the case of a valuable horse, say worth £80, the lower fee was not enough.

Mr. CARLISLE said people would not pay a guinea.

The CHAIRMAN : It is greatly as they have been educated. If Mr. Carlisle examined half the number of horses, and got double his usual price, he would lose nothing, and save himself some trouble.

Mr. DONALD thought £1 1s. might be charged. He knew of no other expert who would give his advice for such a meagre sum as 10s. 6d., and the veterinary surgeon had extra risks, as the subject on which he gave his opinion was constantly changing.

Mr. BELL thought they would have to take districts into consideration. In London some men commanded a better fee than others ; and in Ireland some charged a guinea fee, others 10s. 6d. He thought their clients would not be disposed to give more than 10s. 6d. at home. In London there were men glad to examine horses at 10s. 6d. Others wouldn't do it under £1 1s.

Mr. DONALD inquired if a man could examine a horse properly at an auction mart.

Mr. BELL said when he did examine a horse there he worded his verbal certificate thus, "I have examined this horse, to the best of my ability, at the sale ; and that I should have greatly preferred to have had more time, and you take the responsibility as it is." I consider you ought to have an opportunity of seeing the horse put by, and taken out again.

Mr. CARLISLE : I never examine a horse at the mart.

Mr. DONALD wished to know if an action could be founded on the qualified certificate mentioned.

Mr. BELL : He is liable. I would not give a written certificate.

Mr. DONALD : A verbal certificate would be equally binding if there were a witness. Eminent men hold you cannot protect yourself by qualifying remarks.

CHAIRMAN : If you thought the horse required more time, then you must give more time.

Mr. THOMPSON thought the fee (10s. 6d.) not sufficient.

Mr. THOMPSON moved a very hearty vote of thanks to Mr. Carlisle for his paper, which, he said contained a new and original idea, one which had never been on paper before ; and to Mr. Donald for his valuable paper.

Mr. HARRISON seconded the motion which was carried unanimously.

Mr. CARLISLE and Mr. DONALD returned thanks.

Mr. CARLISLE proposed a vote of thanks to the Chairman. Seconded by Mr. DONALD, and carried. The CHAIRMAN returned thanks, and the proceedings closed.

J. DONALD, *Secretary.*

GLASGOW VETERINARY COLLEGE.

THE Winter Session of this Institution began on 28th October, when the Introductory Address to the students was delivered by Dr. M'Kendrick, Glasgow University. The proceedings took place, as usual, in the Lecture Hall of the College, at 83 and 85, Buccleuch Street, and there was a large attendance. Principal M'Call occupied the chair.

The address was as follows :—

Gentlemen,—I had great pleasure in acceding to the request of your Principal to deliver an address at the opening of the session, because circumstances have led me to take a deep interest in veterinary science, and I am to some extent familiar with the course of study followed by veterinary students. About ten years ago I held the office of Lecturer on Physiology in the Dick Veterinary College in Edinburgh, and I always look back on my connection with that college with feelings of gratitude, because the studies requisite for the position led me to take a broader view of physiology than I would probably have done had my experience as a teacher been confined entirely to students in our medical schools. My connection with the Dick College was also the channel by which I became connected with an important trust. The late Miss Dick, sister of Professor Dick—a man of indomitable energy and of great power, and the founder of the college in Edinburgh—appointed Professor Turner, Professor Chiene, Mr. Middleton Rettie, Advocate, and myself her trustees. The Trustees are directed to allow the funds left by Miss Dick to accumulate until they reach a certain amount, when they are to be divided into two equal parts, one part, £10,000, to be devoted to the furtherance of veterinary science in Scotland by aiding the Dick Veterinary College, and the other part, £10,000, to be used for founding, in the University of Edinburgh, a chair of Comparative Anatomy, or of Surgical Anatomy. The money is steadily accumulating ; and when the provisions of the Trust are carried into effect, they cannot fail in having a most important influence on the progress of veterinary science, and also on the progress of anatomical science generally.

I have now, in the name of the Principal and Professors of this College, to give you a warm welcome, and to express the hope that you will enter on your duties with earnestness of purpose. You have chosen a highly useful profession, and in preparing yourselves for it, you will pass through a course of study which is full of interest, whilst it is also a healthy mental discipline, calculated to develop many of the best parts of a man's nature. You will get a glimpse into the world of science ; the chemist will teach you not a little regarding the chemical and physical laws that regulate every-day phenomena, and regarding the properties of the matter of which this universe is built ; the botanist will lay before you many of the wonderful processes of plant life, and will awaken your interest in the flowers of the field ; whilst the anatomist and physiologist will discuss with you the still more remarkable processes going on in the animal body—processes, a knowledge of which not only involves the highest problems of physical and chemical science, but lies at the root of some of the most profound questions in philosophy. Your scientific training, therefore, apart altogether from the study of the more technical branches of your profession—such as veterinary medicine and surgery—is fitted to extend your mental vision, to enlarge your ideas, to awaken thought, and to stimulate inquiry ; and I confess I do not envy the man who can pass unmoved through such a course of study. To appreciate it, however, let me advise you to enter on it with some enthusiasm. Do not think of science as a barren collection of facts, or as a certain amount of knowledge that must be acquired so as to aid you in the more practical studies. It is all this, but it is much more—it is a

privilege granted to man to see into some of the wonderful processes of the universe. Cultivate a habit of reverentially looking at these things; view them as the devout theologian regards the solemn truths of his science; ever remember, that behind all the facts and phenomena known to man, there are many more of which he knows little or nothing. Such a frame of mind, whilst it enables a man thoroughly to enjoy the study of natural phenomena, will save him from the conceit and rash dogmatism which have not unfrequently brought opprobrium on science and on its followers.

When you pass to the study of the diseases of animals and the means of remedying them, you enter on a field that is most closely connected with the domain of human medicine and surgery. I do not require to enlarge on the usefulness of the veterinary profession. It has the charge of the health and well-being of many millions of animals, which constitute a large portion of the wealth of the nation. It is called upon not only to treat the diseases to which they are liable, but also to ascertain the cause of all disease, more especially of those epidemics which ravage our flocks and herds. It thus includes both veterinary medicine and surgery, and the hygiene of the domestic animals. It deals not only with the cause and consequences of disease, but also with its prevention. Disease amongst our domestic animals always represents a certain pecuniary loss. This loss has to be borne, not only by the rich, but also by the poor. For example, any disease which either lessens the number or depreciates the quality of those animals furnishing food to the community, increases the price of meat, and consequently puts it out of the power of many to obtain it. The value of the live stock of this country is enormous, and constitutes a considerable portion of the wealth of the nation. It therefore becomes a matter of the greatest importance to every member of the community, that veterinary surgeons, who are the advisers of the public in these matters, should be thoroughly educated and prepared for their work. In addition to these considerations, there is also the duty we owe to all animals of promoting their health and well-being, and of relieving them of suffering and pain.

To meet these demands, the veterinary practitioner should receive the same careful education as those who engage in the treatment of disease in the living man. There is a popular idea that the veterinary surgeon does not require to be so well informed as he who deals with the ailments of man. This idea no doubt arises from the higher value justly attached to human life. But if we attempt to treat disease at all, the kind of work to be done in both departments of practice is essentially of the same nature. The structure and functions of the bodies of domestic animals are much the same as in the human being. The diseases to which both are liable present remarkable similarities. The medicines which are found to be useful in the one usually produce beneficial effects in the other. It may be asserted also that the diagnosis and treatment of diseases in the common animals are even a more difficult accomplishment than the same kind of work in man, inasmuch as the patients of the veterinary practitioner can give no direct information regarding their feelings. In this respect practice among the domestic animals resembles the treatment of children, who cannot tell the physician how they feel, nor assist him much in detecting the disease from which they suffer. In treating the dumb animal, the practitioner must therefore depend on objective symptoms. He must have cultivated the practice of rapid and accurate observation. He must collect his information by a careful physical examination of the parts supposed to be the seat of the disease; and he must call to his aid all the appliances and instruments—such as the stethoscope, microscope, and thermometer—which are now used in modern medicine.

Consideration of those facts will at once show the necessity of having our veterinary practitioners thoroughly educated men. They ought to be conver-

sant, equally with students of medicine, with those sciences on which the art of medicine is founded; and they ought to have equally good opportunities of acquiring a practical knowledge of the profession. This ideal is arrived at in the institution to which you have come. I have looked over the curriculum of study of this college, and its fulness and thoroughness have struck me as remarkable. All I shall say of it is that you must work hard to get through it successfully; it will tax your energies, and try your mental powers; but I have no hesitation in saying that if you pass through it successfully, you will start in your profession with a large stock of theoretical and practical knowledge and be ready for your work.

Molecular Physiology.

The subject in your curriculum which naturally attracts my attention most is physiology, and perhaps you will permit me to refer to it with some degree of fulness, and thus, in discussing one topic, follow the example of those who have delivered opening addresses in this place in former years. In tracing the history of any science one soon discovers that there are times when, in consequence of a great discovery, or of a wide generalisation, it is necessary to recast the whole subject, or at all events to view it from a new standpoint. The introduction of the atomic theory into chemistry, the recognition of the great law of conservation of energy in physics, and the adoption of a theory of evolution in biology in its various departments, are examples of such epoch-making events. Again, a science occasionally makes a new start. She leaves the old and well-gleaned fields and explores new territories, adding to her stores at every footstep. Such happened in chemistry when the investigator first went into the domain of organic compounds, in physics when, as we have seen even in our own day, the field of electricity has been traversed by a thousand workers, and in biology when the naturalist turned his attention to the study of development or embryology. Some such change is about to happen, I believe, in physiology; at all events so many new facts have been collected in recent years, by the experimental mode of inquiry, as to make it necessary to review the old ground and to recast some of our older notions. Let me illustrate what I mean.

Physiology, as you know, is intimately connected with anatomy, and most people would at once say that anatomy was the older science. This is true in one sense, but not in another, as it is evident that men, in long bygone ages, must first have watched the movements of animals, the taking of their food, and other processes before they began to dissect. They took the body of the animal to pieces to see how it worked. Thus anatomy arose, and its study is justly regarded as preparatory to understanding all vital actions. In later times, anatomists have devoted more and more attention to the study of form and structure, apart altogether from a consideration of the processes by which these forms have been evolved. This department of science is now called morphology, and as Professor Foster has well said, "Were the whole world suddenly petrified, or were a spell to come over it like that imagined by Tennyson in his 'Day Dream,' but more intense, so that not only the gross visible movements, but the inner invisible movements which are at the bottom of growth were all stayed, the morphologist would still find ample exercise for his mind in investigating the form and structure of the things which had been alive, and which still differed from other things in their outward lineaments and internal build."—*Encyclop. Britann., 9th ed., art. Physiology.*

Physiology now deals with the actions of living beings on their surroundings and with the actions of their surroundings on living beings, and it considers structure only so far as it illustrates or explains action. The progress of the science has shown, however, that there are numerous

problems on which a knowledge of structure throws no light. Thus the movements of the body are effected by muscles, and we study anatomically the framework of bones, the joints, the arrangement of the tendons, and their attachment to the bones, and we obtain, by a study of these mechanical arrangements, an idea of how any particular movement is accomplished. But the fact remains unexplained that the movement is effected by a contraction of the muscular fibres by which their ends are approximated, and we are obliged to ask the question, Why do the muscles contract? We find that muscular matter will contract on direct irritation, but that the usual kind of stimulus causing it to contract is some kind of change passing to the muscle along the nerves. This leads us to investigate the actions of the nerves, and we ascertain that the change coming along the nerve to a muscle, which causes it to contract, originates somewhere in a brain or spinal cord, or nerve centre, as it is termed; further, we find that the change in the nerve centre may in turn be excited by influences coming to it from the periphery of the body along so-called sensory nerves, and that these influences may, by acting on the nerve centre, originate muscular movements at once, or these may be long delayed. Then, again, we arrive at a knowledge of the fact that many of the changes in these nerve centres are connected with consciousness, and that we must conceive a nerve centre as frequently in a state of extreme molecular agitation or change, currents flowing in or passing out, connecting the sensory surfaces with the muscular and other apparatuses, and welding the whole body into one harmoniously working machine.

In the next place, we find that food and air are necessary to a living being. The body of a living being is composed of complicated and unstable chemical substances, capable of being oxidised, and of being reduced by oxidation to simpler and more stable compounds, with a setting free of energy. These more stable compounds are water, carbonic acid, some nitrogenous compounds such as urea, and salts. Such substances are produced from organic matter, whether it be quickly oxidised by burning, or more slowly in the animal body, or still more slowly in the changes that occur when a body is allowed to decay in the earth. During life, these simple compounds are being constantly produced by oxidation processes, and thus "the animal body dies daily in the sense that at every moment some part of its substance is suffering decay, is undergoing combustion; at every moment complex substances full of latent energy are by processes of oxidation reduced to simpler substances devoid of energy, or containing only a little." Thus we arrive at the astonishing conclusion that "every act of life is the outcome of an act of death." Every contraction of a muscle, every beat of the heart, every action of the nervous system, every formation of something in the cell of a gland, are connected with the splitting up of complex molecules into simpler compounds, or, in other words, with the crumbling down, in a molecular sense, of the tissue. All the energy thus liberated ultimately is set free either as heat or motion in the form of muscular work. Thus energy is being continually expended, and to make up for this we take food which is a mixture of highly complex energy-stored bodies, and we breathe in oxygen whereby the oxidisable matters are reduced to simpler compounds, and the potential energy thus set free does work. But the food is not oxidised simply in passing *through* the body; the compounds formed from it become, for a time, part of the living matter itself.

Thus we see that the ultimate problems of the physiology of the present day are concerned with the changes in living matter on which the phenomena of life depend. This is the characteristic of the science as it at present stands. The first physiologists attempted to explain the phenomena of the body by assuming the existence of animal and vital spirits. The

animal spirits were more closely connected with the phenomena of animal life, whilst the vital spirits were common both to animals and plants. By-and-by it was found that many phenomena could be accounted for without such agencies. The next great step was the recognition of the uses of organs of the body, and the body was conceived to be built up of a series of machines, all more or less independent, and still all co-operating in the general life. The work done by an organ was termed its function. The value of this line of thought was so great that it soon dominated physiology, and in the minds of many it still reigns supreme. Further, it must be pointed out that this view of organs and functions has produced brilliant results in physiology. Thus the doctrines of the circulation of the blood established by Harvey are the outcome of a study of the mechanism of the heart and blood vessels, considered as organs, and many other problems, such as the movements of respiration, the mechanism of voice, etc., are capable of solution by the application of mechanical principles to anatomical facts. The anatomical mode of inquiry, however, did not solve the whole question. Thus, when applied to the case of the liver, it showed only the arrangement by which blood was carried to and from that organ, and the ducts for carrying away the bile. The function of the liver was therefore said to be to secrete bile, and for many years this was considered to be the only function of that important gland. Another example of the failure of the anatomical method alone is that for many years no function whatever could be assigned to certain organs, such as the spleen, a large and complicated structure, existing apparently without a purpose.

The next great conception that harmonised with and was the completement of the doctrine of organs and functions, was the cell-theory which defined the cell as the physiological unit, and all functions of an organ were explained as being the aggregate of the functions of the individual cells forming the organ. It was hoped that by a study of the arrangements of cells, their forms, sizes, and general properties, a knowledge of functions would be obtained.

The purely anatomical mode of inquiry received its first shock by the discovery, about the middle of this century, by Claude Bernard, of the glycogenic function of the liver. He showed that the secretion of bile was not the only function of the liver, but that it formed a large quantity of starchy matter, to which the name of glycogen was given. This discovery could not have been made by the most diligent scrutiny of the cells of the liver with the highest microscopic powers, and a mere knowledge of the arrangements of the gland as regards blood vessels, ducts, and cells would have left this function unknown ; while the discovery might have been made by one having no knowledge of the anatomical structure of the liver.

As science advanced, the definition of a cell laid down by the founders of the cell theory had to be modified. The original definition of a cell was a small body having a cell wall, cell contents, and a nucleus or kernel, and it was assumed that here we had the fundamental structure with which the phenomena of life were associated. But discovery showed that these phenomena might he manifested by a mass of matter destitute both of cell wall and of nucleus, and consisting only of a little mass of jelly-like matter, containing a few granules. Then arose the theory of protoplasm. The matter called protoplasm was now regarded as the material basis of life, and the great step was taken of throwing overboard all conceptions of life as the outcome of organisation, and the mechanical result of structural conditions. This is the view of physiological processes now generally held. It aims, as has been said, at putting "physiology on the same footing as physics and chemistry, and regards all vital phenomena as the complex products of certain fundamental properties exhibited by matter, which, either from its

intrinsic nature, or from its existing nature, or from its existing in peculiar conditions, is known as living matter; mechanical contrivances in the form of organs serving only to modify in special ways the result of the exercise of those fundamental activities, and in no sense determining their initial development." (Foster *op. cit.*)

Further research, however, has shown that there are various kinds of protoplasm, and that even protoplasm, when examined by special methods, affords indications of structure. It is not a homogeneous jelly, nor even a granular jelly, as has been described, but it contains a fibrillar net-work, in the meshes of which there is some kind of matter. It is not, however, strictly correct to speak of this fibrillated arrangement as indicative of structure, or at all events of a permanent type of structure—because it is not constant. It varies much from time to time even in the same mass of protoplasm. This amorphous matter, as found in the amœba, is capable of manifesting the phenomena of life; and in the white blood corpuscles it moves; it assimilates dead food and raises it to the level of living matter; it is the seat of chemical changes of a very active character, and in particular it has powerful reducing properties. It has been shown that the protoplasm of vegetable cells has the power of reducing salts of silver, and on this chemical phenomena Loew and Bokorny have advanced the view that living protoplasm contains a chemical compound of the nature of an aldehyde. Its characteristic condition is one of incessant change; molecular processes are constantly going on in it, leading to the upbuilding or the downfalling of its substance. Whether it be a single highly complex chemical substance, or a number of such substances, we do not know; but even if we suppose it to be one substance, it probably does not exist for more than a very brief space of time in the same condition. At one instant it is made, and in the next it is unmade. It is built up of matter that was once dead but now is alive. Dead food probably rises by a series of steps to the condition of living matter; this living matter is protoplasm; and then the descent on the other side begins, which ends in the matter being split up into the comparatively simple substances which are what we may term the waste products. As Foster puts it:—"Further, the dead food, itself fairly but far from wholly stable in character, becomes more and more unstable as it rises into the complex living material. It becomes more explosive, and when it reaches the summit its equilibrium is overthrown, and it actually explodes. The whole downward stair of events seems in fact to be a series of explosions, by means of which the energy latent in the dead food, and augmented by the touches through which the dead food becomes living protoplasm, is set free. Some of this freed energy is used up again within the material itself in order to carry on this same vivication of dead food; the rest leaves the body as heat or motion." (Foster *op. cit.*)

The fundamental properties of protoplasm then are (1) *assimilation*, or the power of converting dead food into its living self; (2) *movement*, or change of form—*contractility*, as it is usually called—arising from internal disruptive or explosive changes (using the term "explosive" in the molecular sense); and (3) *irritability*, or the property of responding to stimulation by changes so minute as entirely to escape the observation of the unaided senses. But these fundamental characteristics are manifested in different degrees by different specimens of protoplasm, and even by the same protoplasm at different periods of its life. Thus the changes occurring in one kind of protoplasm may be such that the decompositions result in energy being set free only in the form of heat, no visible changes of form ensuing. This is the case with the protoplasm of the nervous tissues and secreting cells. Again, in another specimen of protoplasm, such as exists in the muscular and other contractile tissues, the energy may be set free both as

motion and heat, and the most striking characteristic of the molecular change is movement. It is the business of the physiology of the future to determine what it is that causes one kind of protoplasm to differ from another. If it depended on internal structure, that must be of a molecular character, which no scrutiny with the highest microscopical power can ever detect, as the optical method of inquiry has probably come near its limits. It is true that, as the protoplasm manifests more and more one or other of its fundamental properties, features of a structural character may gradually make their appearance, but even these seem to be of a subsidiary character, and not to be the real cause of the specific kind of action. Thus contractile tissue may, by long-repeated activity and specialisation of function, take on the structural characters of striated muscular fibre, but these characters are not essential to the contraction of the fibre. Many fibres contract that are destitute of the structural characteristics of striated muscle. Nor is even the existence of matter in the form of a fibre necessary to contraction. The fibre contracts because it contains protoplasm having the fundamental property of changing its form, owing to molecular changes excited by a stimulus. Thus we gain the position now reached by some of the most profound thinkers in physiology, that protoplasm exists in differentiated varieties, whilst each variety still retains more or less of the general properties of protoplasm. In other words, whilst there is variety in the results of protoplasmic life, there are underlying in all the kinds of protoplasm the fundamental characteristics of the primitive substance.

I might illustrate this by tracing the differentiation of the protoplasm of the cells forming the primitive layers of the embryo, showing how the various tissues are built up, and from these the mechanisms we call organs, and pointing out especially that the functions of all these organs depend on the activities of the protoplasm contained in them. Hitherto the attention of physiologists has been largely occupied, and very properly occupied, with investigating the general mechanism of these organs. For example, we are now acquainted with the arrangements of the circulation of the blood, viewing the heart as a contractile force-pump driving the blood through a series of elastic and contractile tubes and guided by valvular structures. There is probably not much to be done in this direction. But there still remains the problem of the molecular changes happening in the wall of the heart itself. What is the cause of its rhythm? What relation has its rhythm to the activity of the clusters of nerve cells in the wall of the heart itself? Again, we know that the blood is driven through the tissues and organs, and that each element of living tissue selects from it the matters it needs for its growth and activity, but there are many occult molecular processes happening in the structures separating the blood from the tissues and in the absorption by the tissues of the nutrient materials. We have been too much in the habit of regarding these, or some of these, as simply physical processes like endosmose and exosmose, forgetting that the structures through which the nutrient materials pass are composed of living protoplasm, which so modifies the physical process as to make it unlike what would happen if the membrane were dead.

Already we are getting some insight into the molecular processes concerned in life. This is well illustrated by the changes in the cells of a secreting gland. Take, for example, the pancreas. The ultimate structure shows a number of cells grouped around a space at the end of a canal, which is the beginning of one of the ducts of the gland. Each cell is a minute spheroidal body having a nucleus and composed of protoplasm. So far as the nucleus is concerned, we may put it aside, as it appears to have nothing to do with the secretive activity of the cell, and to be concerned only in its reproductive processes. One side of the cells is bathed in a fluid called

lymph, which has transuded from the capillaries in the neighbourhood; the other side is free and projects into the space. Secretion consists in the accumulation of fluid in this space, and as it is formed it is carried away by the ducts of the gland. Now few, if any, of the elements of the secretion exist preformed in the blood; they must then be produced by the activity of the cells of the gland. The cells are nourished by the lymph, and they grow and undergo various remarkable changes that have been observed only during the last two or three years. It has been noticed that in the cells there are periods of rest alternating with periods of activity. During the period of rest, the cell grows and increases in size, and this is owing not so much to increase in the network of the protoplasm, as to an accumulation of material in the meshes of the network. It has further been noticed that as the material in the meshes increases, the network diminishes, indicating a conversion of the substance of the network into the matter in the meshes. Sometimes this matter may be seen as little granules, and the granules collect chiefly at the side of the cell next the lumen of the canal. During active secretion, these granules disappear and the cell diminishes in bulk; the living protoplasm relieves itself, as it were, of its hoard of stored-up material; in the act it may still be growing to some extent, but the growth of protoplasm is chiefly during the period of rest. But a further discovery has been made. It has been ascertained that the ferment matter in the pancreatic juice, which is its chief chemical characteristic—a substance called tripsin—does not exist in the cells of the gland. The particles in the cells I spoke of are not particles of tripsin, but are particles of a material that readily yields tripsin. This material has been called tripsinogen, or generator of tripsin. The order of events would seem to be, (1) the growth of protoplasm from materials supplied by lymph; (2) the conversion of portions of this protoplasm into tripsinogen; (3) the ejection of the tripsinogen; and (4) its conversion, probably in the very act of ejection, into tripsin. Thus we get a glimpse into the processes going on in this wonderful little laboratory. Possibly we see only several of the steps of the process. From the matter in the lymph to the protoplasm of the cell there may be many transient stages, and again from the fully formed protoplasm to the discrete particles of tripsinogen there may be another series of steps. Another view is that the protoplasm by one magical stroke, as it were, converts the material of the lymph into living matter, and then, in an instant, there may be the degradation of a portion of the protoplasm into tripsinogen Of this we at present know nothing; but the evidence points in the direction I have indicated.

Another illustration of molecular action is found in the study of the changes in muscle when it contracts. Here we have, not secretion, but a change of form—contraction. The evidence is gradually accumulating in favour of the view that this contraction is due to a sudden change (of the nature of a decomposition) of a contractile matter in the protoplasm of the muscle cell. When a muscle contracts there is the evolution of carbonic acid, the muscle becomes acid, from the formation of a special variety of lactic acid, and there is evidence of other chemical changes. Do these substances come from the protoplasm of the muscle cell directly? There are facts supporting a striking analogy with the changes happening in the secreting cell, namely, that the protoplasm of the muscle cell forms a special contractile matter, and that this contractile matter explodes, or, in other words, is torn to pieces in a molecular sense, when a muscle contracts. The products of the decomposition are ejected; the protoplasm again constructs the contractile substance at the expense of its own material; and the muscle cell is soon ready for another contraction. The energy is set free both as motion and heat, whilst in the case of the secreting cell it appears as heat only.

There is every reason to believe that molecular changes of a similar kind occur in the nervous system. We know next to nothing of the chemical changes happening in nervous tissue, but a study of the nature of the nervous discharges that stimulate muscular fibre to contract, and a review of what is known of the order of events in various kinds of reflex actions, all favour the view that these phenomena depend on molecular disturbances of a chemico-physical kind. When a nerve is irritated, some change is propagated along it to the muscle; this change acts on the matter forming the nerve endings; and the changes in these, in turn, set up the molecular explosions in the contractile stuff of the muscle cell. Again, when a sensory impulse reaches a nerve centre, it may stop there—that is, its energy does not seem to be sufficient to do more than set up changes in the substance of the cell; but in other cases the change in the nerve cell may be rapidly propagated to other groups of nerve cells, and these, in turn, may originate impulses causing muscular contractions. The time occupied in these processes, the occurrence of fatigue, the necessity of repair, all point to the occurrence of molecular changes.

Living matter, then, must exist in many different conditions. The protoplasm of a muscle cell is not the same as that of a secreting cell, and both differ from the protoplasm of a nerve cell. Again, the protoplasm of a contractile cell from a sheep differs from that of a man, and there may be varieties even in individuals of the same species. And yet in all the kinds of protoplasm we have, in a subsidiary way, some of the fundamental characteristics. All kinds of protoplasm have the power of assimilation, and all have the property of irritability. What, then, we mean by living protoplasm is that state of matter which does not ascend higher in the scale of molecular complexity, but breaks down on stimulation into simpler compounds. It is matter in a state of incessant change, and when it is killed it ceases to be protoplasm. According to this view, protoplasm exists only for an instant, or, at all events, for only a brief space of time. The materials we get from a bit of dead muscle, albumen, sugar, fat, saline matters, water, were never alive as such; it is absurd to speak of living albumen; these are matters formed on the death of the protoplasm, or they have been derived from complex bodies that have once been protoplasm, possibly existing in the meshes of the network at the time of the death of the protoplasm. This view of life also gives some conception of how transient it is. The words of Keats may be appropriately used:

> "Stop and consider! life is but a day;
> A frail dewdrop in its perilous way
> From a tree's summit."

These considerations all bear upon our conception of what life really is. Few, if any, physiologists would assert that life is added to matter, a force, an ethereal intangible something which eludes our thoughts. Nor is it enough to say that it is a property of protoplasm. Is it not nearer the truth to say that it is a special condition of matter? Physicists now consider the properties of things as expressions of internal movements, and in like manner it seems to me we get a conception of the vital state when we consider it as a mode of motion. The phenomena of life are manifested by matter in a condition of intricate molecular movement, the results of which we see in histological structure and in specific function. Arrest the movements by the removal of water, as in dried seeds and dried infusoria, and all the phenomena of life cease. Stop the movements by cold and the organism becomes dormant, but the molecular machinery is ready to start again when it is raised to a proper temperature. Heat the organism too much and the molecular movements are so altered, or disturbed, or quickened, as to be incompatible with the living state, and the machinery may fly to pieces. The

properties of different kinds of protoplasm depend, according to this view, not on the properties of the chemical elements or chemical compounds which we can extract from it after it is dead, nor on the play of the ordinary physical forces, but on the particular kinds of molecular motion occurring in the living stuff. Thus life expresses a dynamical state, and may be spoken of as a property of matter in the same way as we use the term to designate heat, elasticity, or electricity. It cannot be called a mode of energy, because we cannot bring it within the great law of conservation of energy. What I contend is that vitality cannot be entirely explained by an interplay of the known modes of energy that we call physical. It is a condition of matter *sui generis*. And may we not hazard the conjecture that it is vain to speculate on the origin of life, just as vain as to inquire how, from the primitive atoms which are believed to construct the universe, the movements of matter we term heat or electricity first originated? It has always appeared to me to be a reasonable hypothesis, apart altogether from the evidence many hold as coming from supernatural sources, that the Creator first started this whirl or intricate dance of molecular motion we now call living matter, and that since that time living matter has come from living matter only.

I have led you to-day into these advanced problems, as showing the path physiology is pursuing, and as an indication to you of the deep interest of the subject. My friend Dr. Limont will, during the session, lay before you many facts which you can afterwards think of in the light of these speculations. You see the high course of study before you. I trust that the session which you have begun will be characterised by efficient teaching, diligent study, and high moral tone. Without these, failure is inevitable—with these, success is certain.

At the close of Professor M'Kendrick's address, the Gold and Silver Medals gained during the past year were handed to the successful students by Principal M'Call, who announced that of 118 students examined during the past session by the Board of Examiners appointed by the Royal College of Veterinary Surgeons, 88 students had been successful in passing the examination. (Applause.) He intimated that he had founded a Free-studentship for the son of a deceased or indigent veterinary surgeon, and had made arrangements for a bursary of £20, or a Gold Medal of that value, to the student who obtained the highest aggregate marks in his first and second examinations before the Board of Examiners. (Applause.)

Dr. MARWICK said: Gentlemen,—In compliance with the request which your Principal has just made, I rise to propose a cordial vote of thanks to Professor M'Kendrick for his most interesting address. I am too sensible of my inability to speak in adequate terms of this address to say more in regard to it than to express the hope that we may, ere long, be permitted to have it in print for private perusal and consideration. Its interest, obviously, is not limited to the student of medicine—it appeals to every thoughtful man. In being addressed to you here it recognises and emphasises the fact that the profession to which you are to devote yourselves has much in common with that of the physician and surgeon. We cannot shut our eyes to the fact that in every department of professional life, the preparation which was accepted as sufficient thirty or forty years ago, does not meet the requirements of the present day. In the profession with which I am myself connected, for example, a much higher standard is applied than used to be considered necessary. No law student can be held to satisfy present requirements who confines himself to a superficial acquaintance with his test books, and refers to reputed decisions simply to find what judgments have been given under conditions as nearly as possible similar to those in which he may be called on to advise and act. The real student seeks to grasp principles—to trace the growth and development of these principles in older and cognate systems of

jurisprudence—to see how these systems have been and are applied in other countries—and so to raise himself above the antiquated standard of the mere case lawyer. The same observation applies to the study of the profession to which you are to devote yourselves. No man who contemplates the practice of veterinary science, as it should be prosecuted, may content himself with the attainments of the practitioner of former times, or the application to ever-varying animal ailments of stereotyped methods of treatment. Diseases, moreover, seem to change their type both as regards man and the lower animals, and to the investigation of their causes and remedies the highest intelligence and the most advanced modes of investigation must be directed. We have illustrations of this in the methods by which the treatment of Cholera and Hydrophobia are being even now investigated. In like manner also, when cattle disease threatened, some years ago, to decimate our herds, the local authorities of our large towns had to call in the aid of the most skilled men, who carried into their investigations the highest methods and appliances of science. For similar investigations, and the modes of treatment which may be suggested by them, you and the veterinary surgeons of the future must be prepared. In the knowledge and skill acquired by the study, theoretical and practical, of anatomy, botany, chemistry, and physiology, in the constant use of the microscope and the most delicate instruments of physical research, you will find the best means of equipping yourselves for your profession, and I believe a pleasure and fascination altogether independent of financial results. One could not listen to the results of last session's work, as these have just been stated by Principal M'Call, without being satisfied that in this College you have all the advantages of a thorough system of training. May I be permitted to express the hope that you who are now passing through the curriculum may so avail yourselves of your opportunities as to be enabled in after life to elevate the practice of your profession, and to place it in close alliance with that of the physician and surgeon, with which it necessarily has so much in common. Of Dr. M'Kendrick and his claims to our thanks, I do not feel myself at liberty to say more in his presence than that he has laid us all under obligation by his address here to-day. I feel assured you will very cordially express your sympathy with the vote of thanks which I have had the honour to propose.

The vote was heartily accorded, and a similar compliment to the chairman, on the motion of Prof. M'Kendrick, brought the proceedings to a close.

EXAMINATIONS OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

AT the meetings of the Court of Examiners of the Royal College of Veterinary Surgeons, held on the 8th, 9th, and 10th December, 1885, the following students from the Royal Veterinary College were admitted members of the profession :—

Mr.	F. Wright	London.
„	B. Lacey	„
„	G. H. Pickwell	„
„	P. D. Langley	Enfield.
„	F. P. Eassie	London.
„	F. M. Stephens	Bombay.
„	W. Blunsom	Cirencester.
„	F. Hallilay	Leeds.
„	T. S. Newbury	Devonport.
„	A. H. Oliver	„
„	H. Gray	Stratford, E.

The following students passed their *Second Examination* on the 11th and 12th December, 1885 :—

Mr. G. D. Lausley.
„ Josh. Bates.
„ G. F. Brown.
„ J. R. Welsby.
* „ F. J. Carey.
„ H. Goodwin.
Mr. W. H. Flook.
* „ H. King.
† „ R. W. Clarke.
„ W. B. Nelder.
„ H. A. MacCormack.
* „ W. G. Patrick.

The following students passed their *First Examination* on the 14th and 15th December, 1885 :—

Mr. R. C. Bullen.
„ W. A. Stainton.
„ C. N. Parsons.
* „ J. R. Hogg.
„ J. C. Collings.
„ F. Walmesley.
* „ E. Ainsley.
Mr. S. J. Williams.
† „ J. McLean.
„ J. L. Perry.
„ A. D. Lalor.
* „ C. E. Doyle.
„ F. O. L. Walpole.

ARTHUR WM. HILL,
Secretary.

At meetings of the Scottish Section of the Board of Examiners of the Royal College of Veterinary Surgeons, held in Edinburgh on and between the 17th and 19th December last, the following gentlemen passed their Final Examination, and were admitted members of the profession :—

New Veterinary College.

Mr. Charles Galloway	... ...	Preston.
„ Wm. A. Harris	... ...	New York.
„ A. W. Middlehurst	... ...	Liverpool.
„ Charles Drabble	... ...	Chesterfield.
„ Thomas Anderson	... ...	Hexham.
„ D. R. Kayes ...	... ...	Westport, Mayo.
„ W. Berry ...	... ...	Haddington.

Dick Veterinary College.

Mr. Percival Snaith	... ...	Darlington.
„ G. C. Robertson	... ...	Blairgowrie.
„ John Barr ...	... ...	Kirkcudbright.

The following passed their *Second Examination :—*

New Veterinary College.

Mr. T. W. Barraclough.
„ J. Hall.
* Mr. J. Brigham.

Dick Veterinary College.

Mr. J. Best.
Mr. J. McAleer.

The following passed their *First Examination :—*

New Veterinary College.

Mr. E. H. Schofield.
„ J. Borthwick.
„ J. W. Schofield.
„ A. D. Dunbar.
„ R. Horne.
* „ H. Race.
Mr. F. L. Carter.
„ H. Phelan.
„ J. Dickie.
† „ T. Chalmers W. Wright

Dick Veterinary College.

Mr. J. Sheehy.

Glasgow Veterinary College.

Mr. J. Macfarlane.

R. RUTHERFORD, M.R.C.V.S.,
Secretary, Scottish Section Board of Examiners.

* Marked thus passed with "Great Credit."
† Marked thus passed with "Very Great Credit."

Jurisprudence.

A VETERINARY SURGEON'S LIABILITY.

A CASE of considerable interest to stockowners and veterinary surgeons was begun in the Supreme Court, Darlinghurst, New South Wales, before the Chief Justice and a jury of four, on September 16th, and concluded next day. Mr. J. A. Roberts, of the firm of Roberts and Chalmers, iron merchants, was the plaintiff; and Messrs. Stanley and Scott, veterinary surgeons, were the defendants. The plaintiff sought to recover £500 damages, the value of the imported American trotting stallion, Pioneer, which died while under the defendants' treatment. The declaration set out that the horse was negligently treated. The plaintiff gave evidence to the effect that the horse was suffering from contracted feet, and he placed it in the hands of the defendants for treatment. The defendants suggested that the fore feet so affected should be fired, and in order to carry out the operation the horse had to be thrown, and as a consequence the spine was fractured. The horse lived for three days afterward, and then died. He attributed the loss of the horse to the neglect of the defendants. Evidence was called to show that, in performing the operation of firing the feet, throwing the horse was not necessary, and quotations were made of certain text books bearing out this fact.

For the defence, Mr. EDWARD STANLEY, M.R.C.V.S., said that he had been practising as a qualified veterinary surgeon for twenty-three years, and had served seven years before he took his diploma. He was veterinary surgeon to the 5th Royal Lancers, and was now employed as a Government veterinary surgeon. He and Mr. Scott had dissolved partnership in consequence of his Government employment. Mr. Roberts had never asked him to see the horse, but Mr. Scott had consulted with him on the better course to adopt. The horse was suffering from a constitutional disease, and, therefore, was utterly valueless. The disease from which he was suffering being hereditary, it would naturally be transmitted to any stock he might get, at the same time rendering him useless either as a trotting or working horse. It was absolutely necessary to "throw" the horse to perform the operation, which was a most dangerous one to the operator. He had "fired" hundreds of horses when standing, but it was by no means safe, especially with a thoroughbred horse with a very tender skin. The operation was most difficult and delicate, and required great care. The patent hobbles produced were those universally used for the operation, by qualified veterinary surgeons, for the last twenty years. He had never known a horse's back to be broken consequent upon the fall. There were numerous instances where the spine had been fractured by the horse plunging when on the ground.

Mr. ROBERT SCOTT, M.R.C.V.S., said that the plaintiff had called upon him, and asked him to examine the horse Pioneer. Mr. Stanley accompanied him to Waverley, and they came to the conclusion that the condition of the horse was hopeless. He wrote to Mr. Roberts to this effect. The operation known as neurotomy, or the cutting of the nerve tissues, was necessary. On receiving the report Mr. Roberts called upon him, and said he trusted the case was not so hopeless as they may at first have imagined, and asked for advice. The witness said he did not think the circumstances favourable enough to perform the operation of neurotomy. However, he agreed that if in five or six months the horse grew a good hoof he would perform the operation. In the meantime the horse was to be kept in a "puddle" box, and blistered frequently. A few days subsequently Mr. Roberts again called on him, and suggested that the hoofs should be "fired." The witness again pointed out that firing could only have the same effect as blistering, and that was to increase the circulation in the affected part. Mr. Roberts said he was of opinion that the firing would do good, and requested him to perform the operation. Accordingly, with the assistance of his groom and two of the plaintiff's men, the horse was thrown gently on to a bed of straw prepared for the purpose, and the operation performed. As soon as the hobbles were released, the horse stretched out its fore legs to rise, when the witness heard a crack. He made the remark at the time, "The horse's back is broken." He told Mr. Roberts of the occurrence, and recommended him to shoot the animal, to which he replied that he would hold witness accountable for wilful neglect. The nature of the fracture was such that it could not have been caused in the fall.

Other evidence was called to show that "throwing" the horse to perform the operation in question was invariably resorted to, and a leading veterinary authority (Prof. Williams) was quoted in support.

The counsel agreed not to address the jury, and on withdrawing informed his Honour that it was not out of any disrespect to him that they were leaving the court. His Honour jocularly rejoined that probably the learned counsel were going elsewhere to discuss the subject of horses, and so he would accept their assurance.

Next day it was stated that the action was brought for the recovery of £500 damages for alleged negligence in regard to the treatment of a horse. The defendants were veterinary surgeons, and were, it was alleged, employed by the plaintiff to cure a trotting stallion, called "Pioneer," of fever in the feet. The defendants had together seen the horse on a Saturday afternoon, and a document was produced relating to the treatment of the animal, and signed by "Stanley and Scott," but a document of a later date simply bore the signature of the defendant Scott. Scott performed the operation of firing the fore-feet of the horse, and in order to do that used patent hobbles, and threw the animal. The horse's back became fractured, and death took place three days afterwards. The plaintiff's view of the matter was that the operation of firing might have been performed without throwing, and that even assuming that it was necessary to throw the horse, hobbles such as those used for the purpose should not have been employed, but a different method ought to have been resorted to. The defendants' case was that the partnership which at one time existed between them was dissolved before any transactions were entered into with Mr. Roberts, that the operation performed was carried out by Scott on his own responsibility, that when Stanley went to see the horse he acted simply in the capacity of a friend to Scott, that the mode of throwing the horse and firing the animal was in accordance with the teaching of the Royal College of Veterinary Surgeons (of which both the defendants were members), and that the fracture which led to the death of the animal arose after the horse had been thrown and the operation performed, and was due

to muscular contraction, occasioned, according to the authorities, by the animal struggling. A *post-mortem* examination of the horse was made, and Mr. John Stewart, veterinary surgeon, speaking with reference to it, said it showed that the animal was suffering from a disease (Osteo-porosis), the characteristic of which was a brittle fragile state of the bones, with a loose texture.

His HONOUR said that the action was brought by the plaintiff, against the defendants, to recover damages for negligent treatment of the horse, in the way the jury had heard described. The action was brought against the two defendants on the assumption that they were partners. The agreement that had been made was with the firm, yet the defence that had been set up there was that they were not partners, that Scott was the sole person engaged in the business. It was admitted by both that they were partners up to the 25th December. Just at that time Stanley, it was stated in evidence by him, entered the Government service, and the partnership was dissolved from that date. Scott, however, said in evidence that the partnership was continued until the end of December or the beginning of January. Although they said it was dissolved, yet the name of "Stanley and Scott" was at the time over their door, and was over their door still. Moreover, Mr. Stanley went out with Mr. Scott, and both examined the horse. Scott said that Stanley went out with him simply as a friend, and not at all as a contracting party. A report was drawn up—the first draft was written by Stanley and was copied by Scott—and they were both spoken of therein as the firm of Stanley and Scott. There was also some evidence to show that, in talking about those matters, they spoke about what had been done as being done by both. In looking at that part of the case, the jury had to consider whether both or only one of the defendants was liable. The jury had to look at the whole of the evidence, and to consider whether the facts of the defendants having been in partnership, keeping up the name, and joining in a report as to the condition of the horse, constituted sufficient evidence to render them both liable. If the jury came to the conclusion that the contract was made with the firm, and not with Scott alone, then they had in the next place to consider whether the defendants were guilty of negligence, for which the plaintiff would be entitled to recover. Now a man, whether he was a veterinary surgeon, or any other surgeon, was not liable for anything that might arise from mere errors of judgment or from accident, if he used in the performance of his work mere ordinary skill. Where a person used the instruments it was usual for competent persons to employ—and his own experience told him they were proper instruments—then, although other individuals did not agree with him, that would not make him liable. They had heard some passages read from books on veterinary science, to the effect that a horse might be fired without being thrown ; on the other hand, they had heard opinions expressed by other writers, and by witnesses whom they had heard, that the only proper course to adopt in regard to the firing of a horse, was to throw him. Then, as against the mode of throwing, some passages had been read to show that firing might be done by a side line ; and it was said that was the only proper mode. Well, where there was a mere difference of opinion—where side lines were sometimes used, and sometimes another course was adopted—a man would not be liable for an error of judgment in using one course in preference to another. Where two or more courses might be taken, supposing that there was no gross ignorance, a man would not be liable for taking that course which another person might not consider the correct course. Now, what was done was to use those patent hobbles which had been exhibited, and in regard to the particular operation of throwing practised, it was stated that by it the horse was caused to fall, not suddenly,

but gradually. There was also the evidence of two persons, who were present at the throwing, to the effect that after the operation, when the horse attempted to rise on his fore legs, a sudden snap was heard. Well, if the jury believed that evidence, it would seem to show that it was not in throwing the horse down that the injury arose, but it was when the horse tried to rise after the operation that the cracking of the bone took place. The defendants could not be liable for an injury which did not arise from the throwing of the horse down in that way. In whatever way the horse was thrown, if the injury arose in the horse getting up, the plaintiff could not recover. The last witness called described the result of the *post-mortem* examination, which disclosed, he said, that the bones of the animal were very fragile ; and the evidence of that witness was to some extent confirmed by the witnesses who said that when the horse attempted to rise they heard a cracking. The defendants would not be liable if the bones were fractured in that way. The plaintiff must make out his case by a preponderance of evidence, and if the evidence there was not greater on the part of the plaintiff than that on behalf of the defendants, the jury must find a verdict for the defendants. If the jury found that the course pursued was not warranted at all by men of experience, and for the plaintiff, the damages would be such as would take in the value of the horse, £444. The evidence showed that what was done was the usual thing, and, in the opinion of some witnesses, the best thing.

After deliberating for a quarter of an hour, the jury found a verdict for the defendants.

Army Veterinary Department.

Gazette, January 19th.

The undermentioned Veterinary Surgeons, First Class, to be placed on retired pay, with the honorary rank of Inspecting Veterinary Surgeon :—John Baldock, dated 23rd January, 1886 ; Frederick F. Marshall, dated 20th January, 1886.

Obituary.

We have to announce the death of H. F. McGrath, M.R.C.V.S., Kilrush, County Clare ; of P. Walker, M.R.C.V.S., Bradford ; of J. Keay, M.R.C.V.S., Whixhall, Salop ; and of J. F. Thompson, M.R.C.V.S., who died at Whitehaven on January 5th, in his 26th year. Mr. Thompson was the eldest son of H. Thompson, M.R.C.V.S., of Aspatria, and graduated so lately as 1880. A melancholy circumstance is connected with his sudden and premature decease, in that he was to have been married the following day. The *West Cumberland Times* has the following notice of the regrettable event :—"Very distressing are the circumstances in which young Mr. Thompson, veterinary surgeon, of Aspatria, has been called to his death. His marriage with Miss Nixon, of Ghyllbank, Whitehaven, was arranged to take place on Thursday last week ; but in the week previous, through being accidentally crushed by a bull, he received severe internal injuries, which laid him up for a few days. He was, nevertheless, able to visit Whitehaven in the same week ; but on his return home he experienced a renewal of the suffering, and the marriage was postponed until Wednesday last. On Monday he made a further visit to Ghyllbank, and during the day and following night the effects of his injuries were again felt with increasing severity. Medical assistance was obtained, but on Tuesday afternoon he died. The premature withdrawal of a useful and

promising life at a junction so peculiar, has naturally created a feeling of profound and widespread regret, and sympathy with those who are more immediately affected by the sad bereavement."

J. S. Woods, M.R.C.V.S., late of Her Majesty's Indian Army, died on January 20th, aged sixty years, at Charing Cross Hospital, from malignant disease of the rectum, notwithstanding colotomy had been performed.

Germany has just sustained a heavy loss by the demise of one of her most distinguished veterinarians. Professor Dr. Roloff, Director of the Royal Veterinary School, Berlin, and Member of the Imperial Board of Health, died on December 23rd, after a long and painful illness, at the comparatively early age of fifty-six years. Previous to his appointment as Director of the School, in succession to the late Professor Gerlach, Roloff had been for a long time Extraordinary Professor in the Agricultural Institute of the University of Halle. Well known in Germany as one of the most advanced comparative pathologists, his writings are held in high esteem, and are somewhat numerous. He was a contributor to Virchow's *Archiv*, was editor-in-chief of the professional *Archiv fur Wissenschaftliche und Praktische Thierheilkunde*, and had published treatises on Protective Inoculation for Contagious Pleuro-pneumonia (1868); on Cattle Plague (1871); on Tuberculosis in Swine (1875), and on Splenic Fever (1883). His body was cremated on December 27th, Professor Virchow pronouncing an eloquent oration over it before it was consumed.

Notes and News.

SWINE FEVER.—During the quarter ending September 26th, 2,803 fresh outbreaks were reported in Great Britain, and 11,986 swine were attacked, of which 3,128, or more than one-fourth, died. In the preceding quarter the outbreaks amounted to 3,188, and there were 15,407 swine attacked. Under the operation of the England Markets and Fairs (Swine Fever) Temporary Order the disease has declined, and this order has been continued to the end of March.

PLEURO-PNEUMONIA IN AMERICA.—This disease has recently been reported to exist in America in the following States, viz. :—New York, New Jersey, Delaware, Maryland, Virginia, Kentucky, Ohio, Tennessee, and Columbia. In the Netherlands, for a period of four months, no case of this disease was reported. In Great Britain during the thirteen weeks ending 26th September, 125 fresh outbreaks of Pleuro-pneumonia were reported, and 503 cattle were attacked. This shows an increase, as compared with the corresponding period of last year, when there were 77 outbreaks and 276 cattle attacked. The disease has recently been most prevalent in the following counties in England :—Kent, Lancaster, Middlesex, York (West Riding), the metropolis, and the county of Lanark, in Scotland.

CHARGE OF UNSKILFULNESS AGAINST A VETERINARY SURGEON.—At the Congleton County Court, on November 3rd, Mr. Laithwood, M.R.C.V.S., was sued for the value of a colt which he had castrated, and which, it was alleged, had died through his neglect to attend to it after the operation. The evidence of the defendant, however, went to prove that the animal died from Peritonitis, due to exposure to cold, and Mr. Thomas Greaves having given evidence in support, the judge dismissed the case with costs, adding that the prosecution had tried to damage the defendant's repu-

tation in a most careless and reprehensible manner, stigmatising as reprehensible and objectionable the course pursued by the prosecutor.

HORSES OF THE PAST AND PRESENT.—An interesting lecture was recently delivered on this subject at the London Institution by Professor W. H. Flower, LL.D., F.R.S. (the director of the Natural History Department of the British Museum). The large assembly testified their thorough appreciation of the lecture, which was illustrated by many excellent drawings of ancient and modern specimens of the hoofed group of animals, and also by skeletons of the jaws of a horse and the leg of a pony. After some introductory remarks, the professor said that as it was very difficult to understand what a horse really was until they knew a good deal about the relations and family history of the animal, he should have to travel somewhat beyond the facts about the common animal spoken of as a horse. He should therefore go into the history of the whole group of the animals which were believed to be the cousins and ancestors of the horse—or, at least, as many of them as were known up to the present time. There was a period when naturalists looked upon the horse as a very isolated and singular creature, because it walked so differently from other animals; and the naturalists therefore made it an order by itself under the title of "solid-hoof." The fuller knowledge obtained during the past fifty years as to the comparative anatomy of the horse, and as to the myriads of extinct forms of animal life, had shown that the horse was only one of a large group of animals. He should have to assume Darwin's theory of derivation or descent of one form of animal from another, and as he traced the history of some of the animals, the audience would be able to draw their own conclusions as to whether that theory was borne out by the facts. The group of animals of which he would speak were those known as the hoofed animals, and those which were existing now were divided into two great and distinct groups. He then proceeded to deal with the relations between the horse, the rhinoceros, and the tapir. That group comprised the horse and its most immediate allies, such as the donkey and the various forms of zebras, which were practically almost the same in their structure as the horse. More was known about the ancient history of that group, because in early years it was far more abundant in the world than at present. It seemed to be on the decrease—dying out, as it were—and probably would become extinct but for donkeys and horses being so valuable to man. The wild species had become fewer and fewer, and probably before long they would become extinct. After going at some length into details as to the fossils of the hoofed group of animals which had been found in the London clay, the professor gave some particulars as to the habits and characteristics of both the tapir and rhinoceros branches, and then said that the horse family was that branch which had undergone by far the greatest changes. It was, too, the most interesting branch of the family. It had been continually changing from its ancestors, and the points in which the horse had differed were very numerous. It had been gradually adapting itself to the changed conditions of the times. It had gradually increased in size, and especially in the length of the neck; its legs had lengthened, and its toes had disappeared. There were certain alterations in the structure of the bones, but mainly the alterations were in two points—in the teeth and the feet, both of which had been adapting the horse for the altered conditions of his life. So great had been the changes that specimens could be traced back showing that at one time some of them were no bigger than a hare. It was now difficult to find anything more perfect in its whole organisation than the horse. It had ceased to be anything like the tapir, and as the horse was when it lived in woods, forests, by lakes, and on marshy land. It had become changed to an animal destined to inhabit the dry, open plain, far away

from the cover of woods and from the swampy ground, into which its fee might sink, and also destined to live upon the food of the open plain—dry, hard, harsh herbage that grew in open spaces. The modifications of the teeth had now reached the point at which it was difficult to conceive anything better adapted for grinding hard herbage, and the feet had got to the point which specially facilitated speed over hard ground. The whole of the changes had been obviously advantages to the animal, for everything seemed to be concentrated to one point—viz., that of enabling the animal to run speedily over the ground. The foot had been modified into an organ simply for support, and for that purpose it was about as perfect as anything could be. The existing species of horses or horse-like animals had been divided into two kinds—that of the horse and the donkey, between which the difference was not great. The principal difference was that there was a great deal more hair in the tail of the horse, and it came, as it were, from the root of the tail; whereas in nearly all forms of the donkey the hair grew more like that of the cow's tail—at the end rather than at the root. There were curious little horny patches, something like corns, which grew on the horse's legs, but their use or meaning was entirely unknown. The donkey-like animals were divided into two kinds—those which were striped and those which were not. The striped ones all lived in Africa, and the best-known was the zebra. The donkeys were mainly inhabitants of Asia, and probably the ancestor of the present domestic donkey was the Abyssinian wild ass. The true horse, so far as they now knew, was related to those which were found in the highlands of Central Asia. The wild horse at one time was extremely numerous in America. Whether, however, the American horse was of the same species as the European horse was rather doubtful. It was singular that the horses once so abundant in America had become extinct there. The ancestral form of the horse was abundant in that country long before it was discovered by the Spaniards; but all the horses now in that country had been introduced from Europe. The New World on the other side of the Atlantic was certainly well suited to the horse. There was little doubt but that the present domestic horse of this country was derived from the wild horse of Europe and Asia. There was considerable doubt, however, as to the period at which they became domesticated, as it extended beyond the record of history. The gradual modifications in the animal had all followed definite periods of the world's history. All the facts in connection with the horse and its modifications pointed to the conclusion, which he thought it was impossible to resist, and which was now generally adopted by naturalists—and that conclusion was one which the works of Darwin had helped to inspire—viz., that the changes in the different animals had been gradual instead of each being a separate and distinct creation. The changes in the horse had all been produced by gradual modifications of the ancestral form.

VETERINARY SURGERY IN EGYPT.—According to the special correspondent of the *British Medical Journal*, the native veterinary surgeons who were suspended from their offices until they should show that they were qualified, have recently been examined as to their knowledge. They showed a lamentable ignorance of the anatomy of the horse, and not one passed the examination. Their services were consequently dispensed with. This wholesale reform attracted a good deal of hostile criticism from Europeans and natives, including the Khedive. Surgeon-Major Greene visited the latter, and represented to him that the step taken was greatly to the advantage of his Highness's subjects, and succeeded in removing his scruples.

SPAYING COWS.—A correspondent of the *Canadian Breeder* writes of his experience in spaying cows and heifers in Australia. He says that in con-

sequence of the extensiveness of the cattle ranges, from 500 to 5,000 square miles, in Queensland and South Australia, the cattle in many instances become very wild, and are not always to be found when the branding takes place, and so many calves are lost, and frequently some awful specimens of weedy bulls are found. The get from such cattle is weedy, and then the spaying-knife is used on the heifers. He says that he has spayed old cows as well, and has never known the loss to exceed one per cent. He thinks at eight months is about the best time to spay heifers, as they fatten as they grow, and during the worst seasons of drought, a spayed cow or heifer, if fat before, will not lose very much beef, and will put it on again very quickly. He had always found it a good plan to spay wild cows, as it invariably tamed them, and they became fit for beef, whereas before they would kill their calves by constant running. Spayed cows fetched a good price on the market there when fat.

Correspondence.

AMPUTATING HORSES' TAILS.

SIR,—I beg to forward the following extract from a communication lately received by myself from India :—

"A horse with a docked tail becomes, during the hot and rainy seasons, tormented with flies, and, having a short tail, cannot whisk them away ; and when a docked horse is in the districts, the sheath or penis itself sometimes becomes fly-blown and affected with maggots, causing unhealthy sores, which have in several cases rendered stallions temporarily useless, and in two instances permanently unfit for stud purposes."

Comment is needless, but nothing can show in a stronger light the wisdom of the present regulation against the purchase, for army purposes, of horses whose tails have been docked. Liable as they are at any time to be sent on service in hot countries, a docked tail not only ensures continual torment by flies, but exposes a wretched animal to the risk of being tortured by maggots eating the sheath and penis.

J. J. MEYRICK, F.R.C.V.S.

19*th December*, 1885.

DISLOCATION OF THE PATELLA.

SIR,—In your last issue Mr. Maller accuses me of boldness in bringing forward the statements with regard to above ; but I consider he has shown more boldness in considering that all English veterinary surgeons must see as he does. He, like every other, is entitled to his own opinion, but to constitute himself the mouthpiece of the whole profession, and talk as if every one must see after his fashion, is, I think, going a little too fast. We are all well aware of the truth of the saying, "*Tot homines, tot sententiæ*," but when objections are made, in order to be valid they should be a little more explicit than those of Mr. Maller. He has given us a few instances of what he has seen, and, according to him, of what every one can see for himself ; but that they carry any conviction I fail to comprehend. Why has he not mentioned in what position he found the patella, and the condition of the internal lateral ligament on *post-mortem* examination? I here say that I have not accepted M. Chuchu's statements without contradiction, and if any one will study the attachment of the patella on the internal side, strengthened by the complementary fibro-cartilage, and afterward ponder over what takes place during life when this accident occurs, he will find it rather difficult to contradict,

and when the truth is revealed, on *post-mortem* examination, I think the evidence is conclusive. As Professor Williams' authority has been brought forward, I may be allowed to quote from his work. Page 142, he says, "The internal lateral ligament becomes stretched across the internal prominence of the trochlea, and is thus *torn or chafed*." Further, "When the luxation is complete the internal lateral ligament *must be ruptured through its whole thickness*, and the patella slips outward."

This corroborates what I have stated—that it is impossible for the patella to slip outwards over the femoral trochlea without rupture of the internal lateral ligament; and that this cannot have occurred in those cases in which, after reduction, we find the animal proceeding as if nothing had happened is surely patent to all.

HENRY TWEEDLEY.

Glasgow, *January 8th.*

SPAVIN.

SIR,—On page 56 of this month's Journal, I am reported to have said, in describing a specimen of Spavin at the discussion on Mr. Banham's paper, that "In this specimen they would see that it was one of Serous or Fibrous Spavin." What I did say was, that "In this specimen there was neither Serous nor Fibrous Spavin in the seat of the bursa, as described by Mr. Banham in his extracts from Dieckerhoff, but that this was a Bone Spavin, only involving the bone and periosteum, the bursa under the flexor tendon, which was easily demonstrated to all the members present, being neither obliterated nor diseased." Instead of agreeing with Dieckerhoff's theory of the pathology of Spavin, as would appear from the report in your Journal, all the specimens I have seen lead me to believe that his theory, that Bone Spavin is preceded by a Serous and a Fibrous Spavin in the seat of bursa, rarely if ever occurs, but instead any pathological changes in the bursa are of secondary and not primary origin. Furthermore, if Professor Dieckerhoff's pathology of Bone Spavin be true, his treatment must be an absurdity, and to prove this all that is required is to place the following extracts from Mr. Banham's paper side by side:—

Pathology.—"The membrane lining the bursa first becomes reddened, and secretes a serous fluid (not found in the normal bursa), infiltrated with cells, causing a swelling or bursal enlargement—*Serous Spavin.* Plastic lymph is then formed, and the two sides of the bursa become united and indurated, at which stage the process may cease, when we have obliteration of the bursa and the formation of a *Fibrous Spavin.*"

Treatment.—"Dieckerhoff has found opening the bursa situated upon the fan-shaped insertion branch of the tendinous portion of the flexor metatarsi to be most successful. It causes inflammation, union of the walls, and destruction of the bursa."

That is, for the treatment of Bone Spavin we are recommended by Dieckerhoff to open a bursa which, if his theory of the pathology be correct, is obliterated before a Bone Spavin has been formed.

JOHN MALCOLM.

Holliday Street Wharf, Birmingham,
4th January, 1886.

NATIONAL VETERINARY ASSOCIATION.

DEAR SIR,—Will you kindly permit me, through your Journal, to apologise to the following gentlemen for omitting their names from the list of members

in the last proceedings, viz., J. Attwood, Bilston, Staffs.; T. F. Merrick, Northampton; T. W. Whitney, Shepton Mallet; and to ask those who are not properly described in the list to kindly inform me of it.

GEO. A. BANHAM,
General Secretary National Veterinary Association.

THE ARMY VETERINARY DEPARTMENT.

SIR,—I wish to point out two errors in Mr. J. F. Oliver's letter.

1st. The Indian Government, far from taking on extra Veterinary officers, is reducing its already over-worked staff.

2nd. Veterinary officers serving under the Warrant of 1878, can receive neither promotion nor rewards during their ten years' service.

"SACK."

SIR,—I confess I do not understand the greater part of your note to my letter in your last issue. Granted I was in error in asserting there were few men in the Department when the 1878 Warrant was promulgated ; your statement, that the Department contained more officers, supports my argument. For, if it were so, fewer men would be required to join to keep up the complement, and therefore there would be fewer to leave when their ten years were up ; consequently, the chances for the retention of all good men would be greater.

May I ask you to explain—"Under it there is, *perhaps*, not much danger of good officers being dismissed"? Take the fourteen officers who joined in 1884.

Paragraph 14 of the Warrant of 1878 most distinctly states that not more than four shall be retained.

Would you convey that there is not much danger of more than four out of fourteen officers being worth keeping ten years hence? Surely they must be a poor lot now, if ten years' run in the army leaves so many of them worthless. Nor will the Head of the Army Veterinary Department be able to retain as many as he pleases without driving a coach-and-six through the Warrant.

In the latter part of your note, I regret to see you utterly ignore my assertions without controverting them.

Your statement—"and of retaining those who shall have proved themselves worthy of retention"—is in direct opposition to my figures. I must deny your statement, and repeat that so long as only four officers can be retained each year, many good men will have to go. The subject is too important to be dismissed with a foot-note, and I would suggest your views be given in a leader.

You have upset one of my assertions, and thereby strengthened my position ; may I beg you to disprove the others in your next?

J. F. OLIVER.

[It is considered premature, at least, to discuss this matter further. A year or so hence will be time enough to open the question again.—ED. *V. J.*]

BROKEN BACK.

SIR,—The enclosed clipping from the local papers gives an account of a case that may interest your readers. As I cannot remember a similar prosecution, I venture to ask you to do me the favour of giving it publicity in your Journal.

Professor Williams' remarks (*vide* his work on "Surgery") were very valuable, although so brief, and if I may be permitted to offer a suggestion to Dr. Fleming and Professor Robertson, who are, I believe, both engaged in writing books on veterinary surgery, it is that they lay down distinctly the fact of horses being liable to break the bones of their backs, thighs, etc., *by their own muscular efforts* in straining to break away from the shackles, hobbles, or ropes that secure them; and that such accidents cannot be avoided by any known mechanical appliances, which will control the animal, and at the same time ensure the safety of the operator and of his assistants.

It is undoubtedly good practice to reduce the patient by low feeding, and give a purgative the day before operating, and also to administer an anæsthetic, but many circumstances will militate against these precautions being always practicable.

It would be well to point out what diseases of osseous tissue predispose to fracture, such as Mollities Ossium, Fragilitis Ossium, Osteomalacia, Osteoporosis, Callus or Anchylosis. Judging from my own experience, Anchylosis is the most frequently met with in these *accidental* fractures. The vertebral processes in almost all horses exhibit a very marked tendency to this condition, owing to the transformation of the ligamentous tissues into osseous, brittle, and unyielding material, most frequently entirely unassociated with any symptoms indicating the gravity of the transformation, and not of necessity accompanied by age, although most frequently seen after the adult period.

It should also be distinctly stated that the majority of surgical operations on the limbs of horses are consequent on ossific diseases; and although the surgeon diagnoses the case as constitutional, nevertheless he is fully warranted in operating, and should be held free from vexatious legislation, because, without operating, the animal is comparatively valueless, and the operation may arrest the disease. Some veterinary surgeons think they are safe if the owner gives a written assurance that he will accept all the risk of an operation. I see two objections to this: First, it creates unnecessary alarm, and is likely to be interpreted by the owner that the surgeon anticipates evil consequences to his animal; whereas the accidents are certainly not one per cent. of horses thrown with hobbles, or casting ropes, for the purpose of surgical operations. Secondly, the surgeon, in point of law, would still be liable, if negligence or carelessness were proved against him, no matter what agreement the owner may have signed. He signed in good faith, being willing to risk his animal to fair, legitimate, and skilful manipulation, with proper appliances to ensure, as far as possible its safety and that of the persons engaged in the operation.

The state of the veterinary profession in these colonies is most disheartening; the people are egotistically ignorant of animal diseases, and charlatanism is rampant.

EDWARD STANLEY, F.R.C.V.S.

Sydney, N.S.W.

[Broken back and its prevention are fully treated of in Fleming's "Operative Veterinary Surgery."]

THE NATIONAL VETERINARY BENEVOLENT AND DEFENCE SOCIETY.

SIR,—Our Society has existed over twenty years ; we have defended many cases, and helped many families in need. At the present time we have nearly £2,500 in hand. There are those who find fault with us because we feel an anxiety to mediate between an offended or aggrieved client and any of our members, with a view to bring about an amicable and honourable settlement of the dispute. They taunt us as being a settling society ; they say, on principle we ought to defend every case that turns up ; that we are really a fighting society. Now, with this definition of our Society I am totally at variance. I would not continue a member of it another day if this pugnacious, fighting principle must dominate our actions, instead of being ruled, as now, by reason, fairness, and justice. When it is called a settling society, and is spoken of in a spirit of reproach and obloquy, then I resent the taunt as being indecorous, churlish, and insolent. Taking our Society in a proper sense, in a magnanimous and generous sense, it is truly a settling society. What else is it? When we undertake to inquire into the case, if we find it is one that we can defend on principle, we assume the responsibility of the case. If we do not arrange the case and settle it with the client, we engage a solicitor ; we instruct him, and if the judge, or judge and jury, decide against us, we have to find the cash ; we have to settle it in the one case exactly the same as in the other. Therefore, I say in either case, whether we settle it with the plaintiff ourselves, or through the medium of a trial, it comes to the same thing ; only in the one case it may cost £10, in the other £100. *A settlement takes place*, and the designation of a settling society, when spoken of in a proper and becoming spirit, is a legitimate and *proper definition.*

Now, let us for a few moments just look into the working of this Society as it is at present constituted. We will suppose one of our members writes to us that he has received a lawyer's letter or a county court summons for, say, £20 or £50, being the supposed amount of loss his client has sustained consequent on some neglect of our member. It may be a horse lamed in shoeing, or injured in casting him, or blemished in blistering, or unsound when passed sound. The course we adopt is to call a meeting of Council ; the defendant explains the case to us ; we consider it, and, acting on the information we then possess, given us by the defendant from his point of view, we decide to defend him. But we have also the power to seek an interview with the plaintiff, which we always do, and also examine the horse in dispute, when practicable. We get all the particulars from the plaintiff's point of view ; *this is invaluable to us.* We can now understand the *whole case* ; we are now enabled to judge and act fairly and justly. We often find that the first impression we formed of the case becomes considerably modified ; that if we allowed the case to go into court, and by dint of good management and generalship we won the case, we feel in our conscience that it would be an unjust result ; in fact, it would be a proceeding in which a body of honourable men would not feel justified under such circumstances. We, as business men, approach the plaintiff in an affable and kind manner, and say to him : "Whatever we say to you is without prejudice. We find your case has many weak points in it, and you know the uncertainty of law ; do you not think it would be much better for you to try and settle it?" We always find him open to reason, willing to avoid law. With a little skilful discussion, we come to an amicable and honourable settlement, perhaps for one-half, or one-third, or one-fourth the amount he is suing our member for.

We will now for a moment compare this mode of proceeding with the fighting, defending method so strongly advocated by some of our members. We will suppose that a client, who is a litigious person, feels himself aggrieved with his veterinary surgeon ; it may be he has passed a horse which he finds,

or considers to be, unsound; or he is lamed in shoeing; or injured in casting him; or from some other cause. He at once goes to his lawyer, who may be a thoroughly honourable and honest man: the client explains the case to him fully from his point of view. The lawyer, having listened attentively to the whole case, is naturally led to view it in the same light the plaintiff sees it. He says the case seems clear enough; if you take it into court you must get a verdict—you are sure to win your case. What other opinion, I would ask, could he form *whilst he is completely in the dark as to the case from the other side?* Well, a letter is written applying for £20 or £50, the supposed amount of loss sustained. The veterinary surgeon, when he receives it, is startled and frightened; he at once hurries off to his solicitor; he explains the whole case to him from his point of view. The solicitor forms his opinion of the case from this information given him, and then says the plaintiff cannot succeed in this case—you can successfully defend it. How should this lawyer, I would ask, be able to form any other opinion so long as *he is completely in the dark about the case from the other side?* Again, this point must be borne in mind, that neither solicitor will, on any account whatever, *allow you to go and see the other side*, or make any overtures. Oh no! this would be showing the white feather; it would be playing into the hands of your opponent. What occasion is there for it so long as you have so strong a case? And in this manner both sides are deluded, allured, and imposed upon. Then the case comes into court, and, as the case proceeds, and the witnesses disclose the true case of both sides, the lawyers are surprised at the complexion the case assumes. Then, when the whole case is disclosed, the judge, or judge and jury, can form a fair and just opinion and decision. They are just placed in the same position we were in when we had got at the full particulars of both sides, *but with this difference:* in one case there is no anxiety, no angry feeling perpetuated, no loss of character or business, no public exposure, no court fees, no counsel, no lawyer's bill, etc., to be paid.

This fact also must not be lost sight of, that both judges and jurymen are fashioned like to ourselves. They are actuated by the same feeling and desire to do right, but *there is this very important drawback:* they do not possess that valuable knowledge which veterinary experience alone can give, and which we can bring to bear and assist us in understanding everything bearing upon the case, and for this reason we are ten times more likely to arrive at a correct and just decision. Added to this, I may mention that the officers of the Society do not debit to it any expenses or loss of time incurred in the carrying out of these duties.

Knott Mill, Manchester. THOMAS GREAVES.

THE NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY.

THE VETERINARY MUTUAL DEFENCE FINANCIAL STATEMENT,

From January 1st to December 31st, 1885.

1885. CASH RECEIVED.	£	s.	d.
Balance in Bank, January 1st, 1885	198	9	9
Cash in hand ,, ,,	18	15	5
Subscriptions received from Jan. 1st to Dec. 31st, 1885	105	15	6
Bank Interest, June 24th, 1885 ...	2	4	9
,, Dec. 24th, 1885 ...	1	9	3
	£326	14	8

1885. CASH PAID.	£	s.	d.
January 20th, Ingall and Pearson, Birmingham	6	10	0
September 15th, Cash returned to Mr. Brizzell	5	0	0
November 8th, George Howden, printing rules	9	16	0
Dec. 31st, Secretary's Account ...	2	1	0
,, Treasurer's Account ...	2	9	6
,, Cash in Bank	297	6	3
,, Cash in hand, since paid into Bank	3	11	11
	£326	14	8

Audited and found correct, JOHN B. WOLSTENHOLME.

January 11th, 1886. THOMAS GREAVES, *Hon. Treasurer.*

THE NATIONAL VETERINARY BENEVOLENT FINANCIAL STATEMENT,

From January 1st to December 31st, 1885.

1885. CASH RECEIVED.	£	s.	d.
Balance in Bank, January 1st, 1885	165	5	9
Cash in Mersey Docks	1900	0	0
Dividend on £1300, June, 1885, less tax	25	7	0
" " Dec., 1885 "	25	3	9
" £600 June, " "	11	5	9
" Dec. " "	11	4	9
Two half-years' Bank Interest ...	2	14	1
	£2141	1	1

1885. CASH PAID.	£	s.	d.
January 14th, Mrs. Fallding and Family	5	0	0
January 23rd, Brown's orphans ...	5	0	0
April 27th, Mrs. Rushall and Family...	5	0	0
August 13th, Mrs. Rushall and Family...	5	0	0
September 15th, Mrs. Fallding and Family...	5	0	0
November 17th, Mrs. Rushall and Family...	5	0	0
December 24th, Cash in Bank ...	211	1	1
" " in Mersey Docks	1900	0	0
	£2141	1	1

Audited and found correct, JOHN B. WOLSTENHOLME,

January 11th, 1886. THOMAS GREAVES, *Hon. Treasurer.*

LIST OF SUBSCRIPTIONS FROM JANUARY 1ST TO DECEMBER 31ST, 1885.

1885.		£	s.	d.
Jan. 8	Mr. J. Bale	0	10	6
" 8	" W. Carless	1	1	0
" 8	" Triggar	1	1	0
" 8	" Beddard	1	1	0
" 8	" H. M. Stanley ...	1	1	0
" 8	" Russell	0	10	6
" 8	" J. Freeman	0	10	6
" 8	" E. Meek	1	1	0
" 8	" Hy. Thompson...	1	1	0
" 8	Messrs. Cartwright and Son.....	2	2	0
" 8	Mr. H. W. Caton ...	1	1	0
" 8	" C. Sheather	1	1	0
" 8	" E. H. Leach ...	0	10	6
" 8	" J. H. Goodall ...	1	1	0
" 8	" C. Moir.....	0	10	6
" 8	" R. Reynolds.....	1	1	0
" 8	" J. C. James	0	10	6
" 8	" W. Elam	1	1	0
" 8	" F. G. Samson ...	1	1	0
" 8	" G. A. Banham ...	1	1	0
" 8	" Hy. Olver.....	0	10	6
" 8	Messrs. Storrar and Son.....	1	1	0
" 8	Mr. T. Walley	1	1	0
" 8	" T. Gregory	0	10	6
" 8	" W. Whittle	0	10	6
" 8	" T. Markham	0	10	6
" 8	" James Rowe	1	1	0
" 9	" E. Nuttall	0	10	6
" 9	" R. C. Edwards ...	0	10	6
" 11	" F. T. Stanley ...	1	1	0
" 11	" Edwin Faulkner	1	1	0
" 11	" T. D. Lambert ...	1	1	0
" 11	" T. D. Broad	1	1	0
" 11	" T. G. Chesterman	1	1	0
" 11	" J. R. Cox	1	1	0
" 11	" F. E. Knott	2	2	0
" 12	" J. Overed	0	10	6
" 13	Messrs. Batt and Son	2	2	0
" 13	Mr. Hy. Withers.....	1	1	0
" 15	" A. Hy. Santy ...	1	1	0
" 15	" Wm. Bower	1	1	0
" 15	" Wm. A. Field ...	0	10	6
" 15	" Thos. Barker.....	1	1	0
" 18	" G. H. Pyatt	1	1	0
" 18	" P. Danby	0	10	6
" 18	" B. Cartledge	0	10	6
" 18	" T. Dallar	1	1	0
" 18	" H. Stanley, deposit on account of defence	5	0	0
" 20	" T. Collins	0	10	6
" 21	" C. Crowhurst ...	0	10	6
" 26	" T. W. Wragg ...	1	1	0
" 26	" C. Morgan	1	1	0
" 26	Sir F. Fitzwygram ...	1	0	0
" 26	Mr. E. Newson	0	10	6
" 26	" T. E. Angers ...	1	1	0
" 28	" J. W. Anderton	0	10	6
" 28	" W. E. Schofield	2	2	0
" 31	" G. Ball, jun.	2	2	0
Feb. 3	" Hy. R. Perrins...	1	1	0
" 3	" A. L. Gibson ...	1	1	0
" 7	" J. H. Ferguson...	0	10	6
" 13	" W. Woods.....	0	10	6
" 13	" J. S. Carter	0	10	6
" 13	" Wm. Broughton...	0	10	6

1885.			£	s.	d.
Feb. 13	Mr.	R. Roberts	1	1	0
„ 13	„	W. Williams	1	1	0
„ 13	„	S. Locke	1	1	0
„ 13	„	H. Ferguson	1	1	0
„ 16	„	J. M. Axe	0	10	6
„ 16	„	W. Cawthorn ...	0	10	6
„ 28	„	Thos. Aubery ...	0	10	6
Mar. 4	„	John Lawson	1	1	0
„ 4	„	A. Lawson	1	1	0
„ 5	„	W. F. Peacock...	1	1	0
„ 11	„	John Brizzell.....	1	1	0
„ 11	„	J. B. Wolstenholme	1	1	0
„ 27	„	Hy. Blunt	1	1	0
May 15	„	F. Blakeway	1	1	0
„ 17	„	J. Brizzell, deposit on account of defence	5	0	0
June 24	„	J. E. Barling ...	0	10	6
„ 29	„	T. Greaves	1	1	0
Aug. 7	„	J. Scrivens.....	0	10	6
„ 7	„	Thos. Secker.....	0	10	6
Aug. 7	Mr.	E. Woodyer	1	1	0
„ 7	„	T. W. Riddler ...	1	1	0
„ 7	„	Hy. Hogben	0	10	6
„ 7	„	Jos. Woodyer ...	1	1	0
„ 7	„	Peter Walker ...	0	10	6
„ 7	„	G. H. Darwell ...	1	1	0
„ 12		Messrs. P. Taylor and Son.....	2	2	0
„ 22	Mr.	Wm. Dobee	1	1	0
Sept. 1	„	Thos. Cave	1	11	6
„ 19	„	Philip Deighton...	0	10	6
„ 20	„	A. Bains	1	1	0
Oct. 22	„	T. Hopkins	1	1	0
„ 24	„	A. Over	0	10	6
Nov. 2	„	J. M. Broad	1	1	0
Dec. 16	„	Mr. Nuttall, deposit on account of defence	5	0	0
„ 21	„	Thos. Briggs	1	1	0
„ 21	„	G. Morgan..... ..	1	1	0
		Total	£105	15	6

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from T. H. Lewis, Edinburgh; C. Gresty, Newcastle-on-Tyne; J. B. Gresswell, Louth; "Pharmacon"; R. Rutherford, Edinburgh; T. Greaves, Manchester; A. W. Hill, London; Fred. Smith, A.V.D., London; H. Tweedley, Glasgow; J. Malcolm, Birmingham; R. H. Dyer, Limerick; J. J. Meyrick, A.V.D., London; "Sack"; J. H. Steel, A.V.D., Bombay; C. Cunningham, Slateford; J. F. Oliver, London.

BOOKS AND PAMPHLETS: *H. Dalziel*, Mad Dogs and Hydrophobia; Encyklopädie der Gesammten Thierheilkunde und Thierzucht; Studies from the Biological Laboratory of the John Hopkins University; Bulletin of the Société Centrale de Médecine Vétérinaire.

JOURNALS, ETC.: *Revista Popular de la Exposicion Rural Internacional; Echo Vétérinaire; Journal of Agricultural Society of Victoria; American Live Stock Journal; Deutsche Zeitschrift für Thiermedicin und Vergleichende Pathologie; Wochenschrift für Thierheilkunde und Viehzucht; Admiralty and Horse Guards Gazette; Mark Lane Express; Live Stock Journal; Hufschmied; Bladen tot Bevordering van Vecartsenijkunde in Nederlandsch Indie; Journal of Comparative Medicine and Surgery; Lancet; British Medical Journal; Clinica Veterinaria; Presse Vétérinaire; Archiv für Wissenschaftliche und Praktische Thierheilkunde; American Veterinary Review; Recueil de Médecine Vétérinaire; Revue Vétérinaire; Journal de Médecine Vétérinaire et de Zootechnie; Edinburgh Medical Journal; Annales de Médecine Vétérinaire; Journal of Microscopical Science.*

NEWSPAPERS: *Baltimore Sun; Scotsman; Bell's Weekly Messenger; New York Herald* (four copies); *Madras Mail; Sunderland Herald and Daily Post; Alnwick Guardian.*